[redacted] SP-136 E
110 PAGES
22 JANUARY 1959

SPECIAL HANDLING

CGR-0328
copy 4 of 4

DISCOVERER-CORONA

GENERAL BRIEFING PORTFOLIO

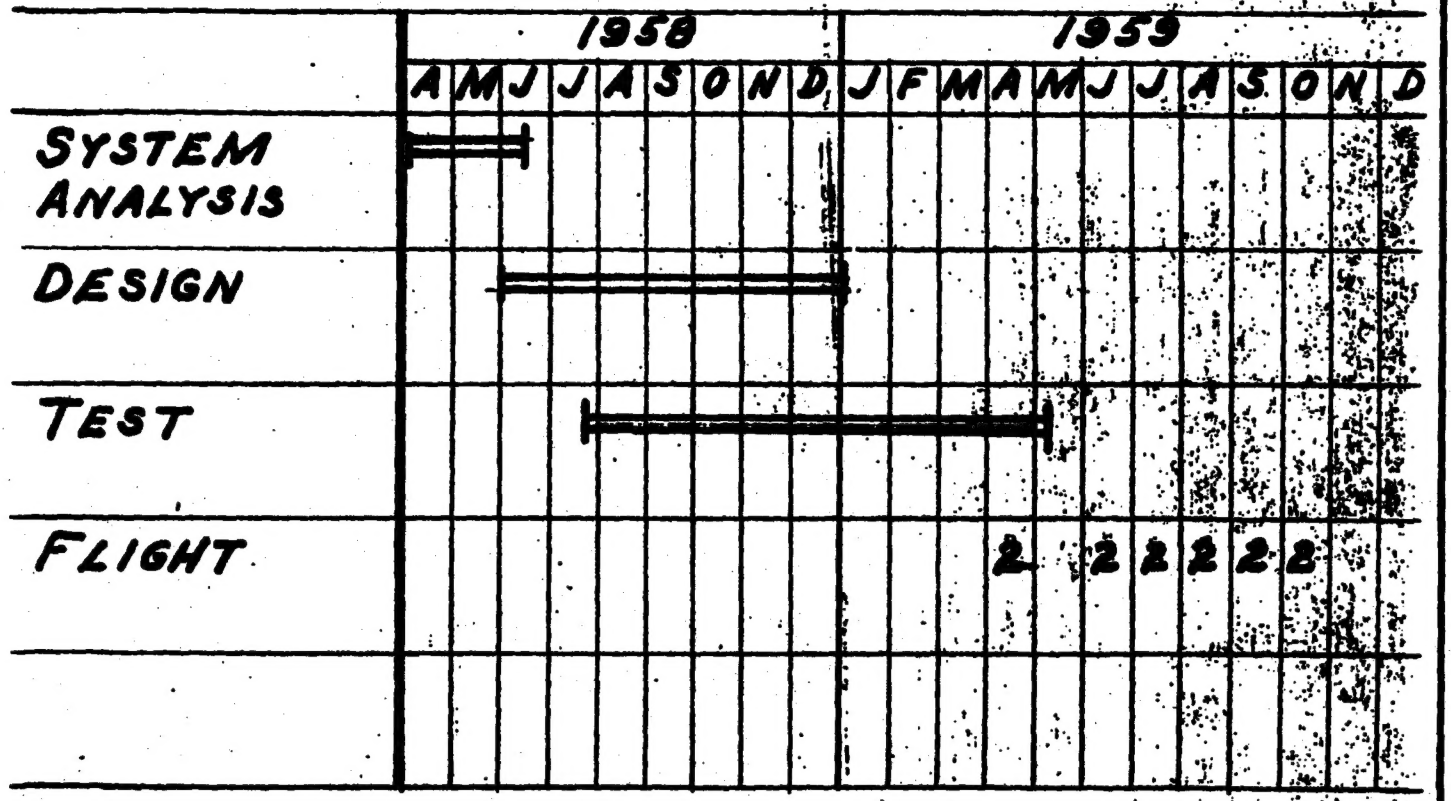
SPECIAL HANDLING

Notice of Page Substitution

Scope

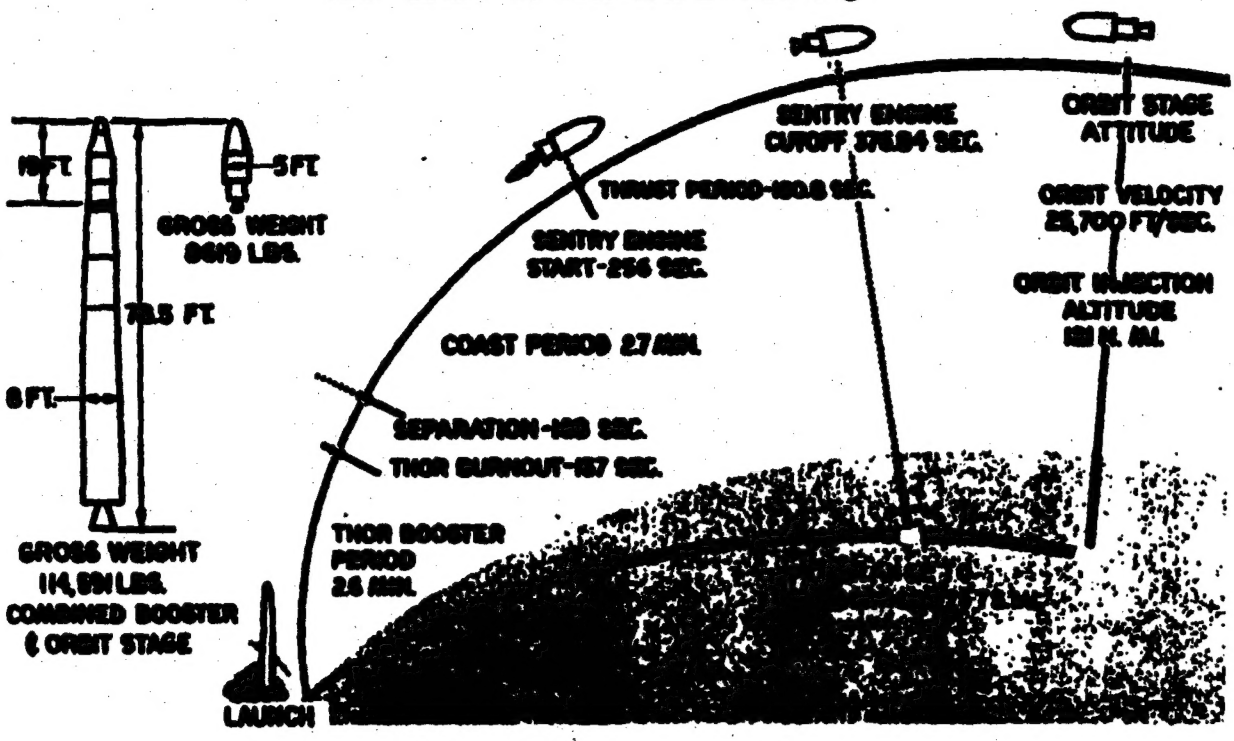
For the purposes of electronic archiving, this page is a substitute for an unscannable page.

GENERAL SCHEDULE

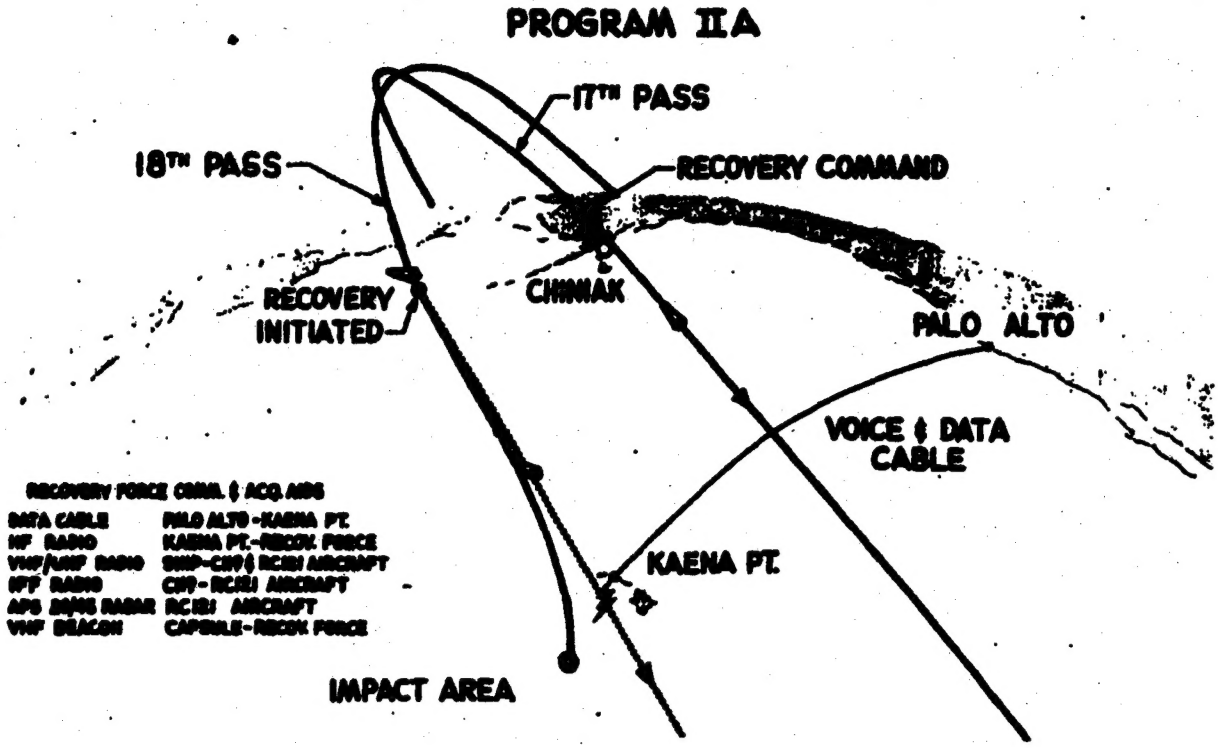


DISCOVERER TRAJECTORY TO ORBIT

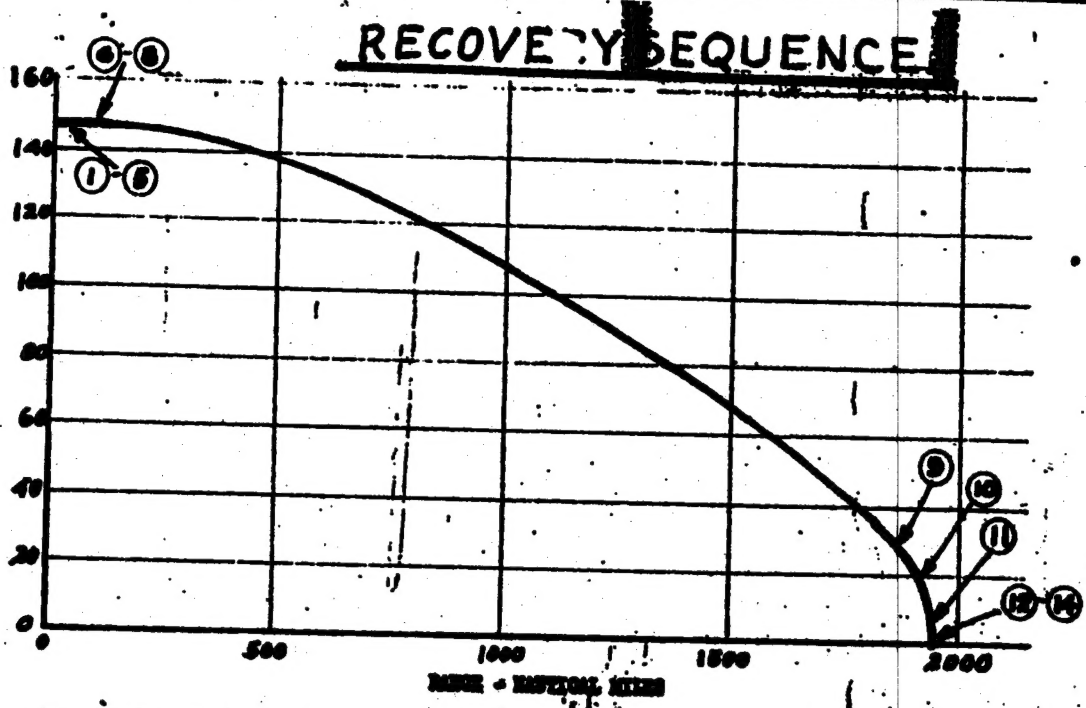
183° EAST OF NO.-VAFB - FLT. No5



WS117L RECOVERY ORBITS



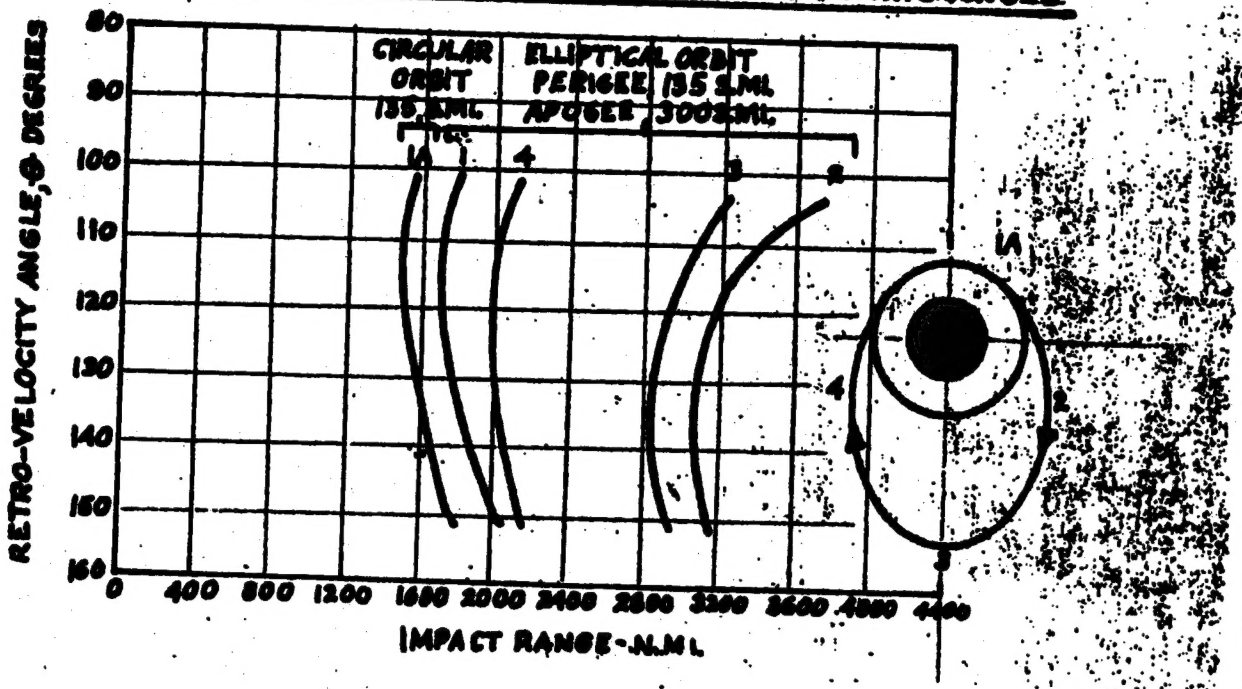
RECOVERY SEQUENCE



(1) CAPSULE ARM (TIME 0)
(2) CAPSULE VERTICAL DESCENT (1 min)
(3) CAPSULE IMPACT (1.5 min)
(4) SPIN UP TO 40 RPM (2.5 min)
(5) FIRE DESCENT (3.5 min)
(6) DESCENT PARACHUTE (13.5 min)
(7) SPIN TO APPROXIMATELY 1000 RPM (13.5 min)
(8) THRUST CONE AND HOUSING LANDED (15 min)
(9) RECOVERY BEACON STARTS TIMER (135,000 Ft. Alt.)
(10) ABLATIVE SHELL JETTISONED (80,000 Ft. Alt.)
THERMAL COVER LANDED
PARACHUTE DEPLOYED
CHUTE REMOVED
BEACON ANTENNA DEPLOYED
BEACON & LIGHT ACTIVATED
(11) AIR PICKUP ACCOMPLISHED (10,000 Ft. Alt.)
(12) WATER IMPACT IF AIR PICKUP FAILS
(13) SEA MARKER DEPLOYED
(14) WATER PICKUP ACCOMPLISHED

WS117L PROGRAM IIA

IMPACT RANGE VS. RETRO ROCKET FIRING ANGLE



PREDICTED IMPACT AREAS

PRE LAUNCH - AREA I

PERFORMANCE VARIATIONS
RETRO ATTITUDE & VELOCITY
REENTRY DRAG

90% PROBABILITY

DOWNRANGE - 750 N. MILES
CROSSRANGE - 400 " "

POST TRACKING - AREA II

TRACKING ACCURACY
RETRO ATTITUDE & VELOCITY
REENTRY DRAG

90% PROBABILITY

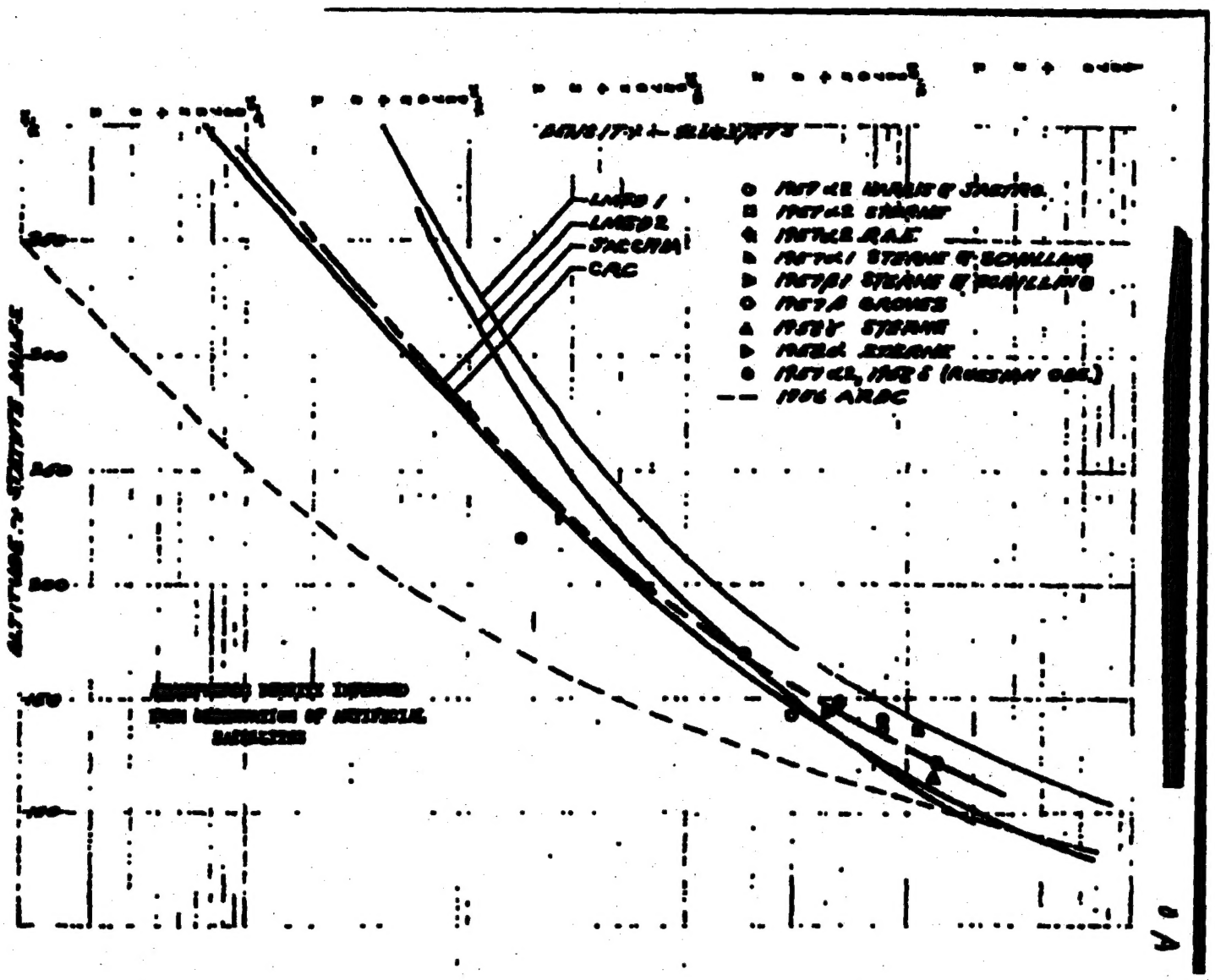
DOWNRANGE - 97 N. MILES
CROSSRANGE - 36 " "

99.7% PROBABILITY

DOWNRANGE - 176 N. MILES
CROSSRANGE - 66 " "

RE-ENTRY DISPERSION SUMMARY

COMPONENT	DOWN RANGE	SIDE RANGE
RETRO ROCKET DYNAMICS	± 67 N.M	± 32 N.M.
2% VARIATION IN I_{sp}	± 34 "	± 0 "
± 2 SEC. SEPARATION TIME ERROR	± 8 "	± 0 "
RADAR TRACKING	± 44 "	± 9 "
RE-ENTRY WIND	± 2 "	± 2 "
±15% VARIATION IN C_D A/M	± 10 "	± 0 "
	± 86 N.M.	± 33 N.M.


LINES 1
LINES 2
SUCCESSIVE
CAC
AIRDC

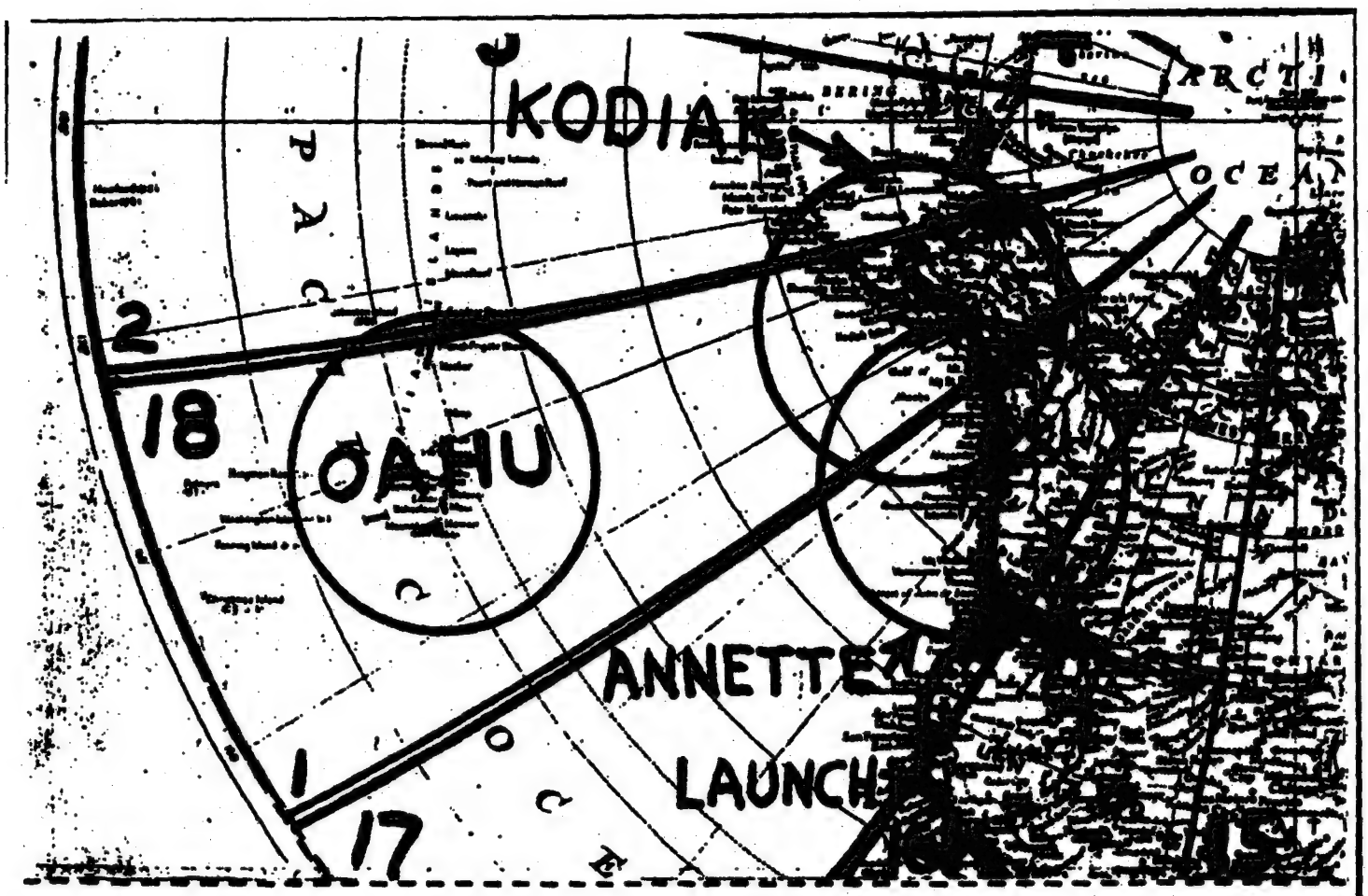
Notice of Page Substitution

Coverage

For the purposes of electronic archiving, this page is a substitute for an unscannable page.

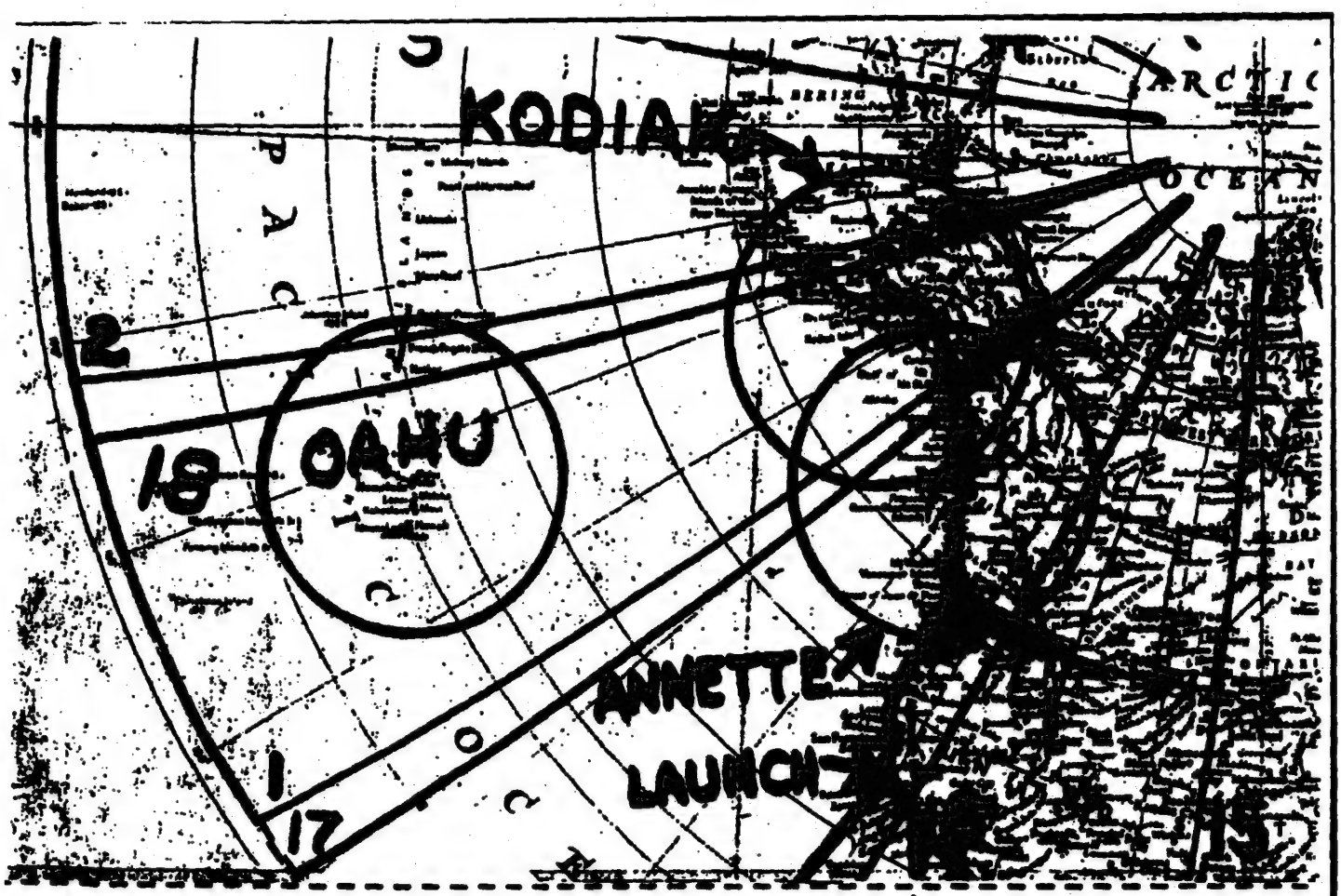
NOTICE OF REMOVED PAGES

Pages 9 through 12 of CORONA, ARGON, LANYARD programmatic information are not provided because their full text remains classified.



GROUND TRACKS & TRACKING STATION COVERAGE

POLAR ORBIT, PERIGEE 118 S. Mi. (NOMINAL ORBIT)
ECCENTRICITY = .01, PERIOD 89.56 Min.
ADVANCE PER ORBIT = 22.45°



GROUND TRACKS & TRACKING STATION COVERAGE

POLAR ORBIT, ALTITUDE 138 S. Mi.
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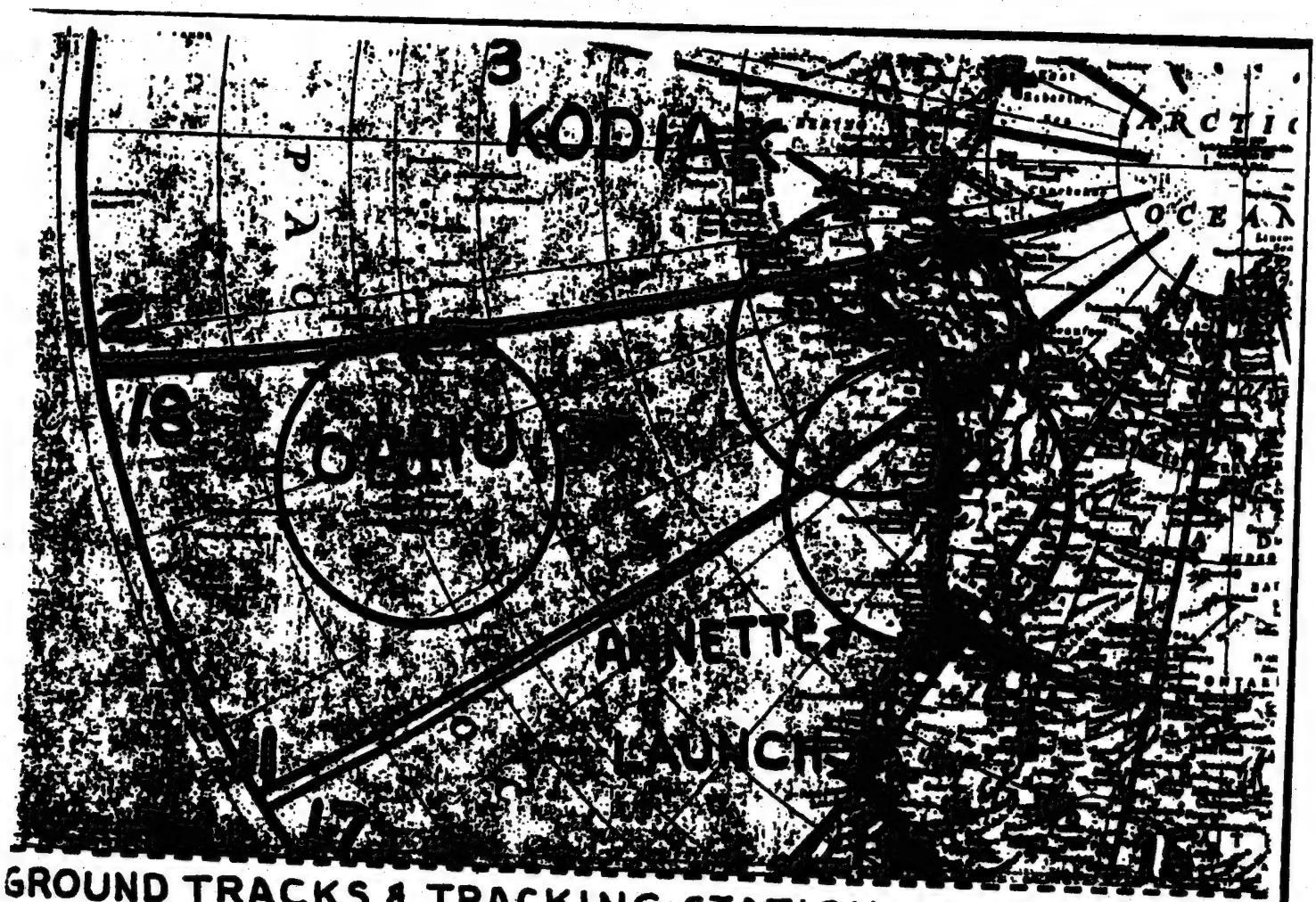
ADVANCE PER ORBIT = 22.30°



GROUND TRACKS & TRACKING STATION COVERAGE

POLAR ORBIT, PERIGEE 98 S. MI.
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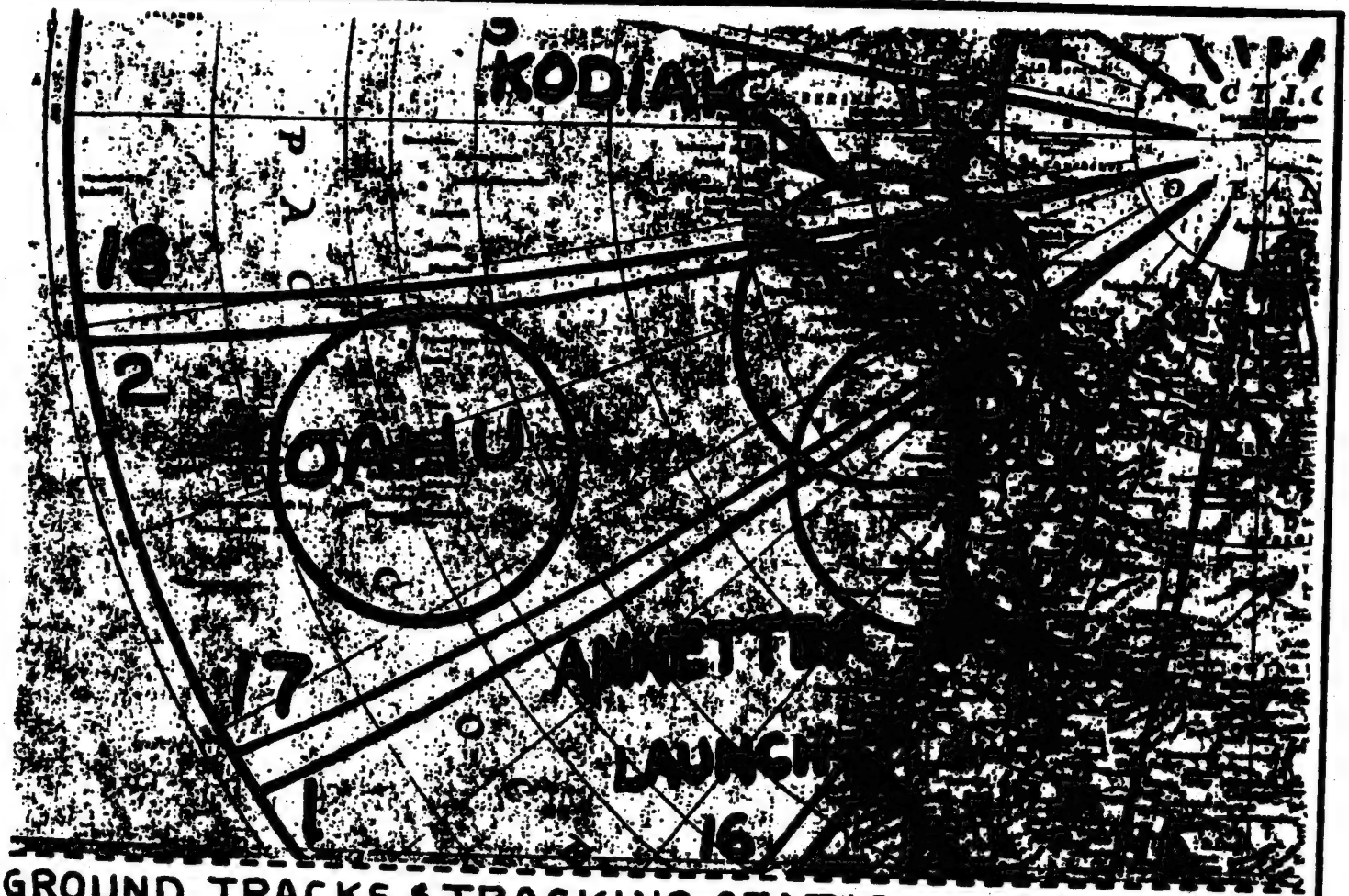
ADVANCE PER ORBIT = 22.45°



GROUND TRACKS & TRACKING STATION COVERAGE

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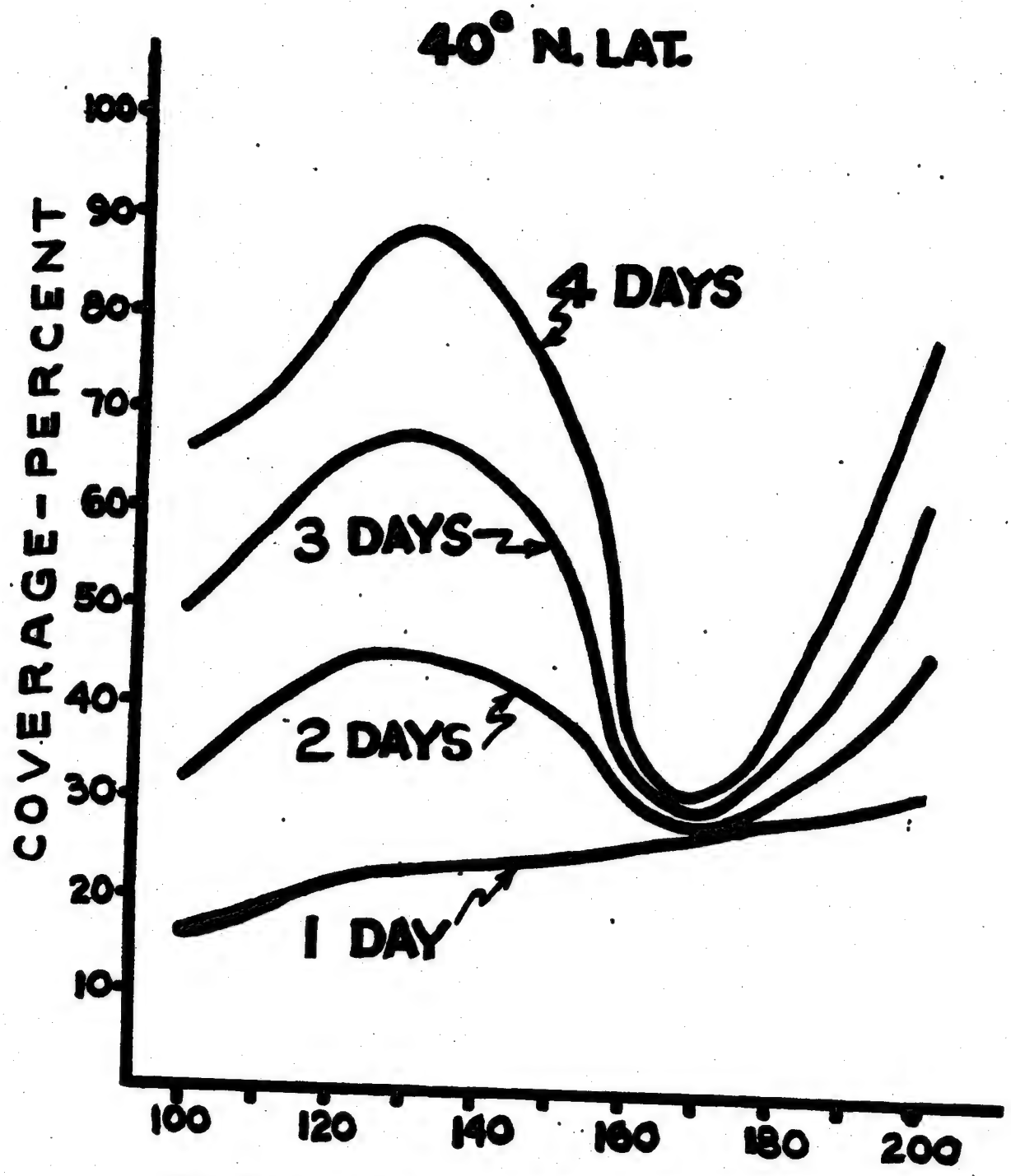
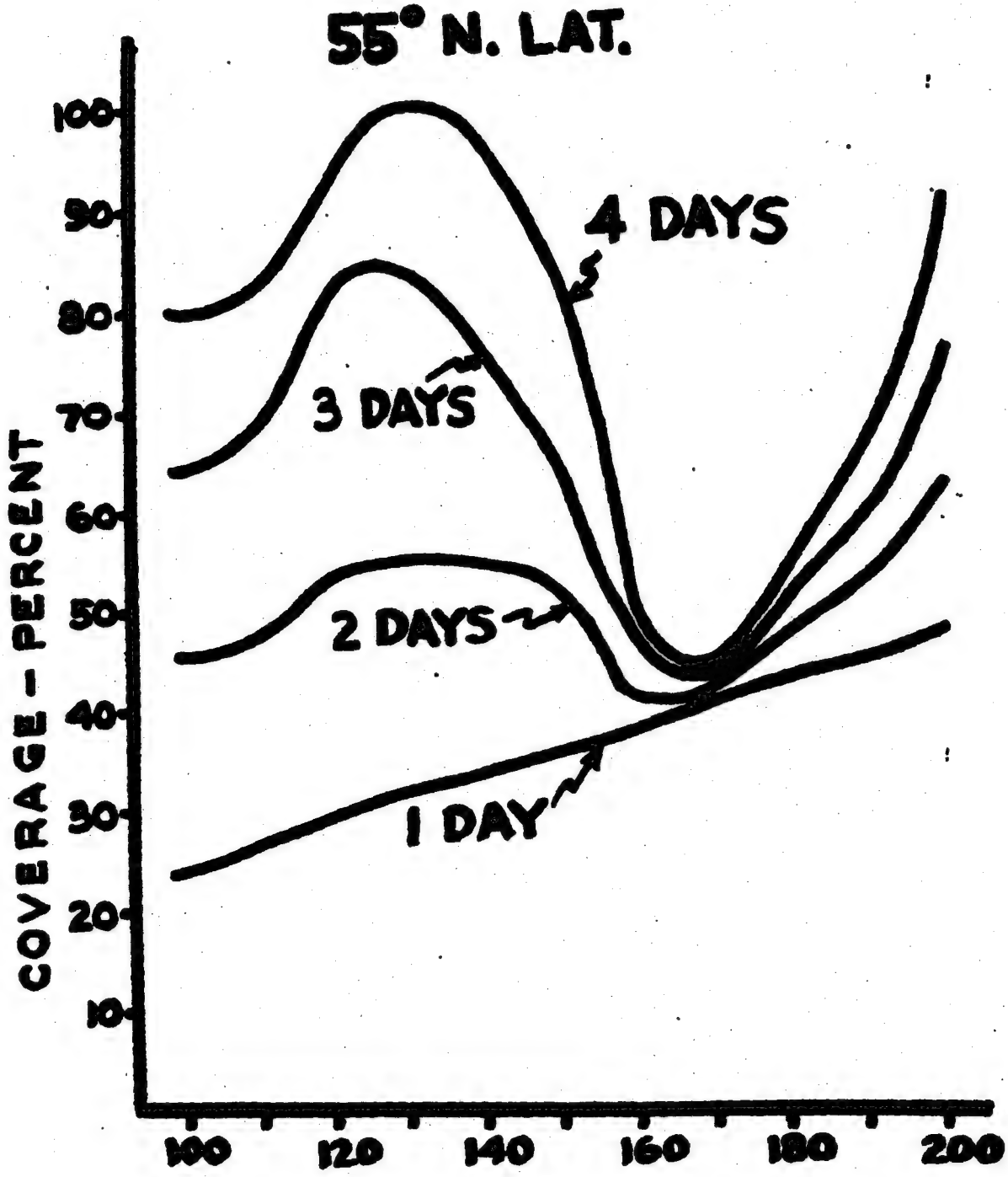
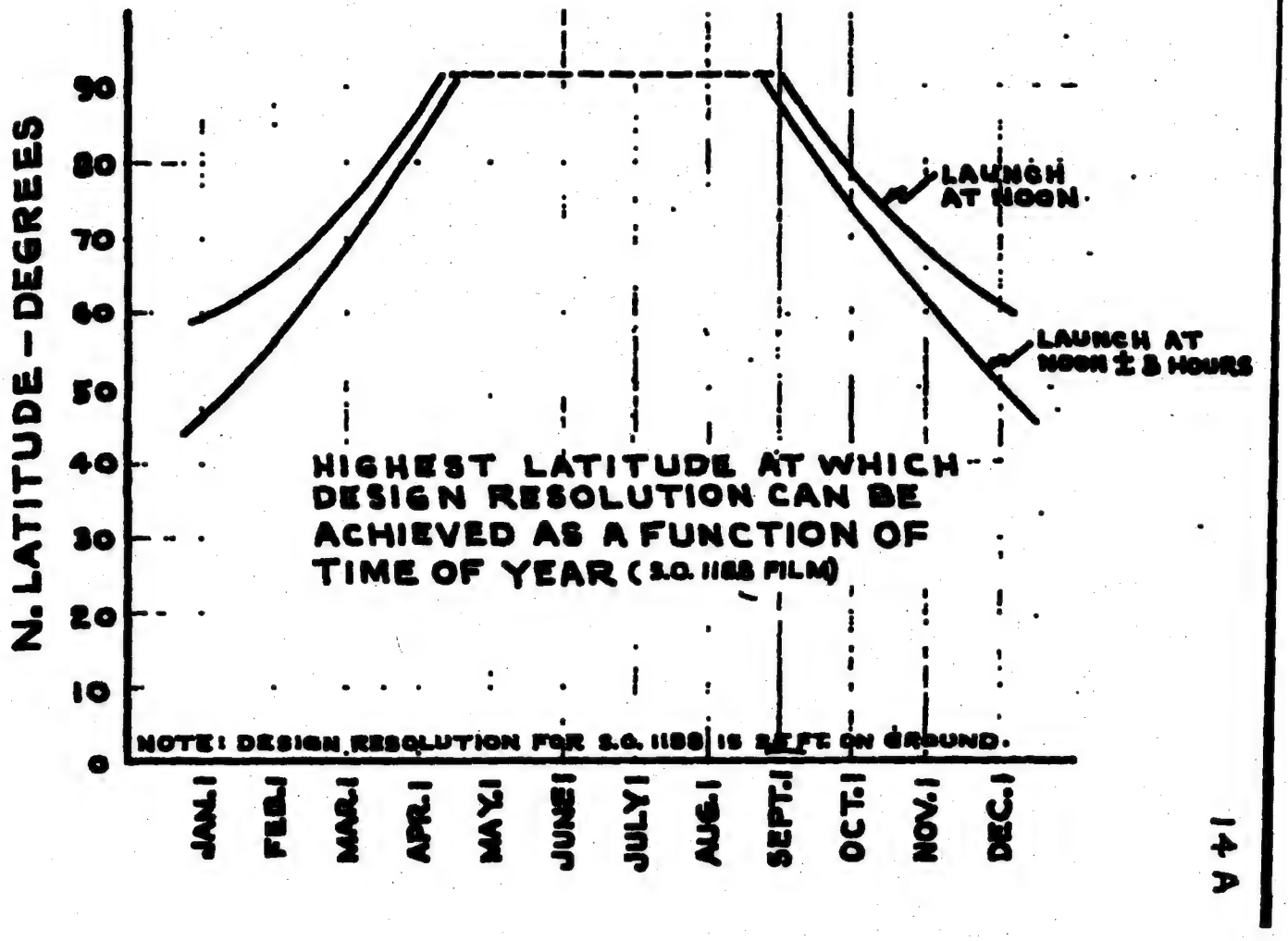
ADVANCE PER ORBIT = 22.62



COVERAGE Vs ALTITUDE

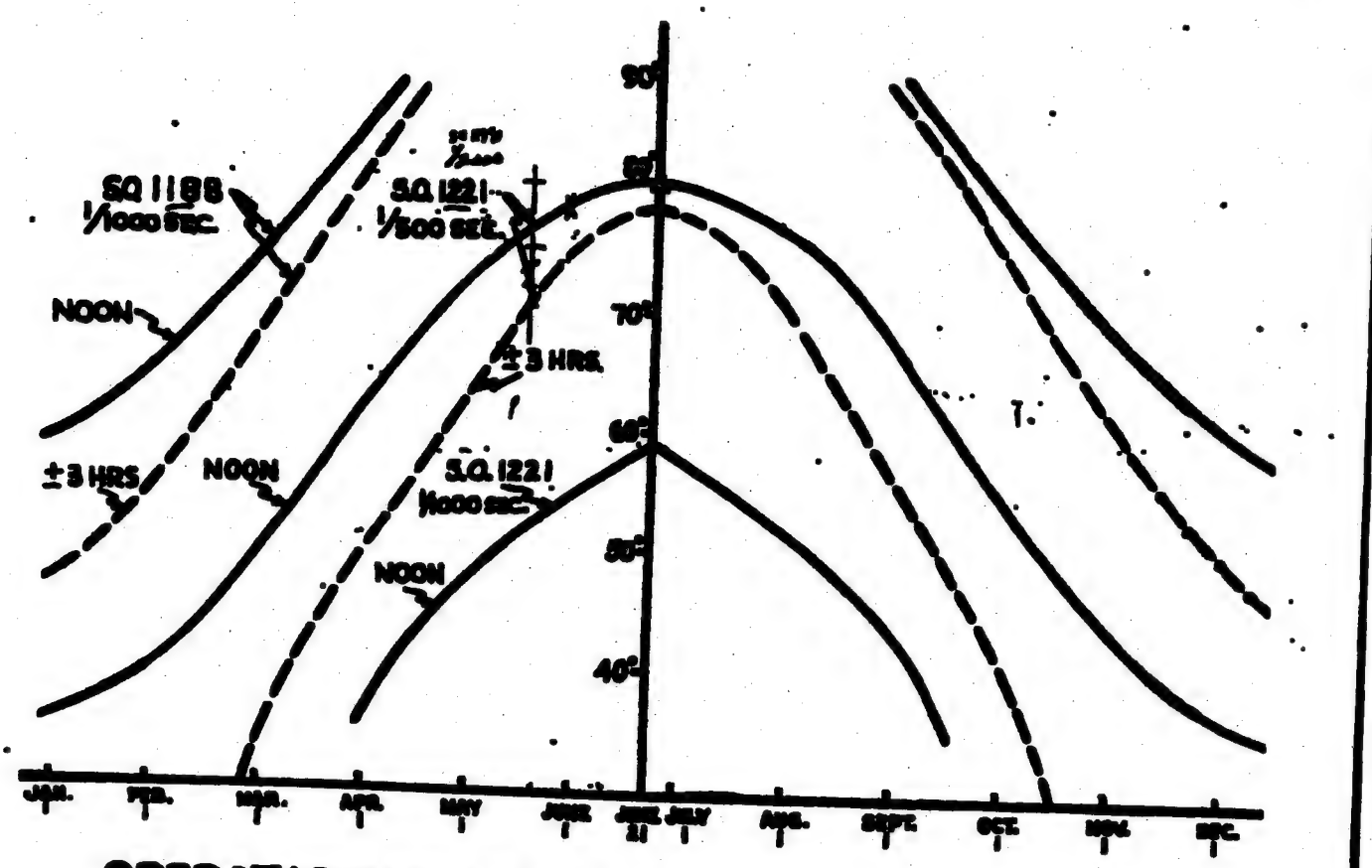


COVERAGE Vs ALTITUDE

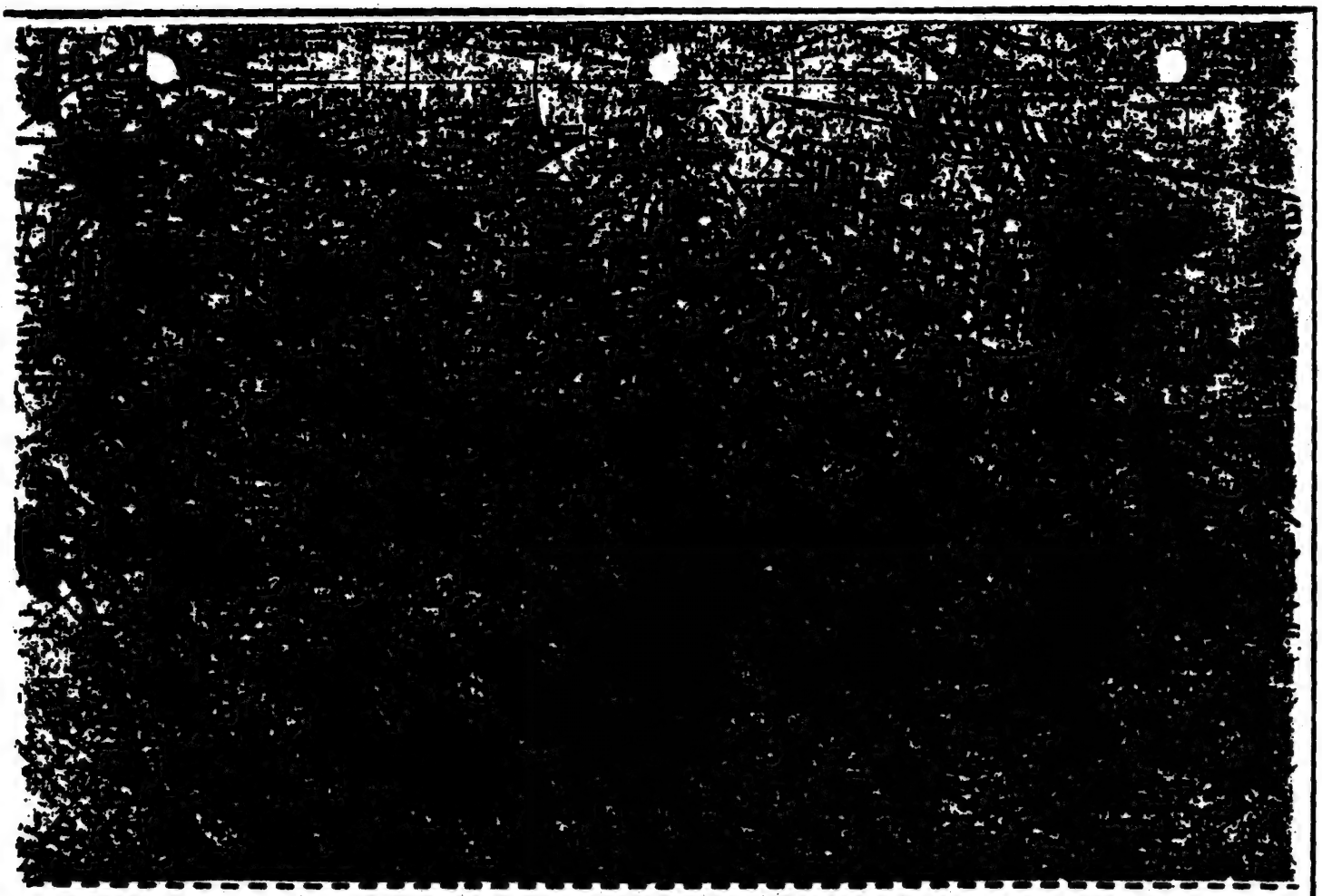

N. LATITUDE – DEGREES
0
10
20
30
40
50
60
70
80
90
JAN.1
FEB.1
MAR.1
APR.1
MAY.1
JUNE1
JULY1
AUG.1
SEPT.1
OCT.1
NOV.1
DEC.1
LAUNCH AT NOON
LAUNCH AT NOON ± 3 HOURS
HIGHEST LATITUDE AT WHICH DESIGN RESOLUTION CAN BE ACHIEVED AS A FUNCTION OF TIME OF YEAR (S.O. 1188 FILM)
NOTE: DESIGN RESOLUTION FOR S.O. 1188 IS 2 FT. ON GROUND.

14 A

N. LATITUDE – DEGREES
90
80
70
60
50
40
30
20
10
0
LAUNCH AT NOON
LAUNCH AT NOON ± 3 HOURS
HIGHEST LATITUDE AT WHICH DESIGN RESOLUTION CAN BE ACHIEVED AS A FUNCTION OF TIME OF YEAR (S.O. 1221 FILM)
NOTE: DESIGN RESOLUTION FOR S.O. 1221 IS 18 FT. ON GROUND
JAN.1
FEB.1
MAR.1
APR.1
MAY 1
JUNE1
JULY1
AUG.1
SEPT.1
OCT.1
NOV.1
DEC.1

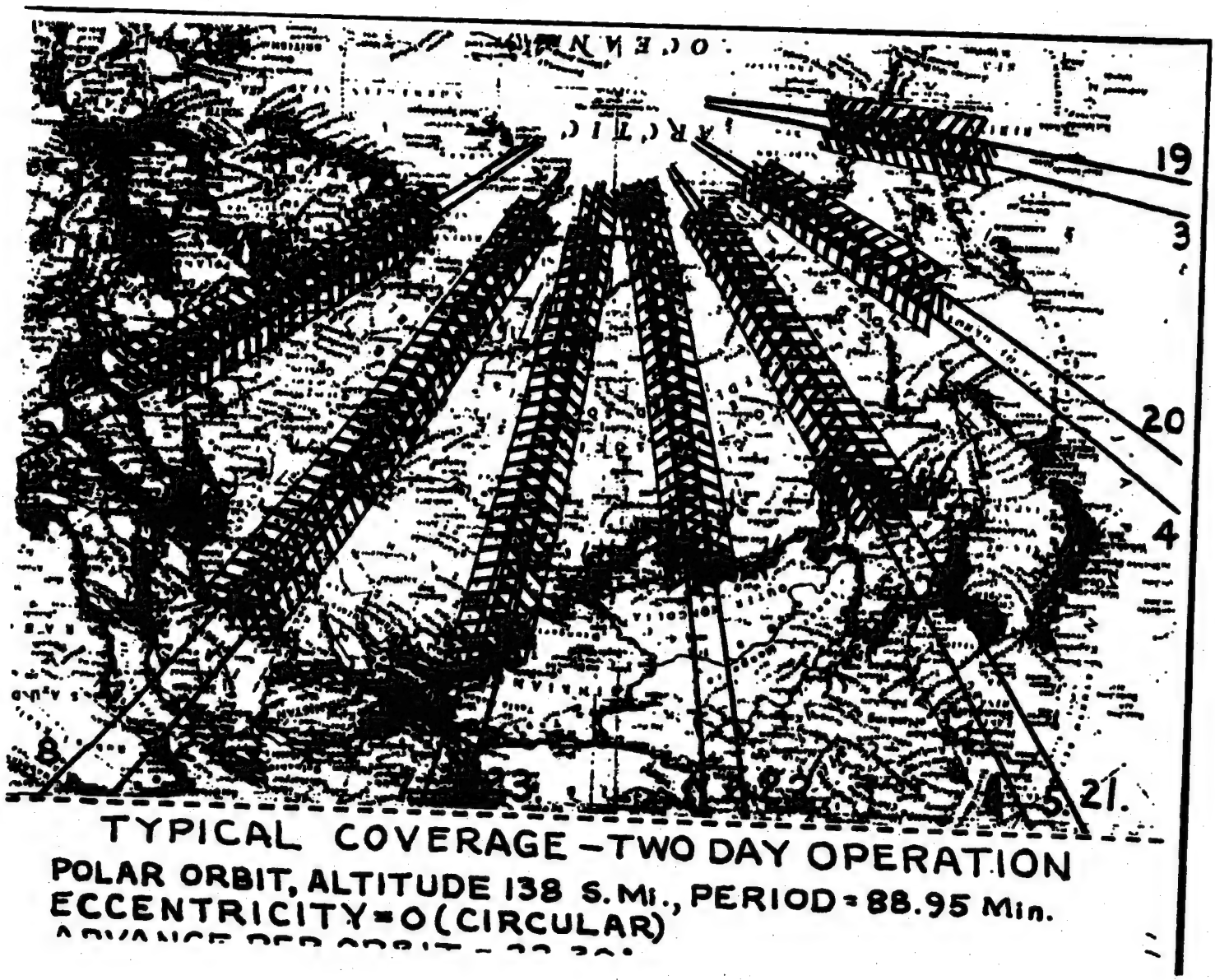


OPERATIONAL MONTHS. Vs. LATITUDE



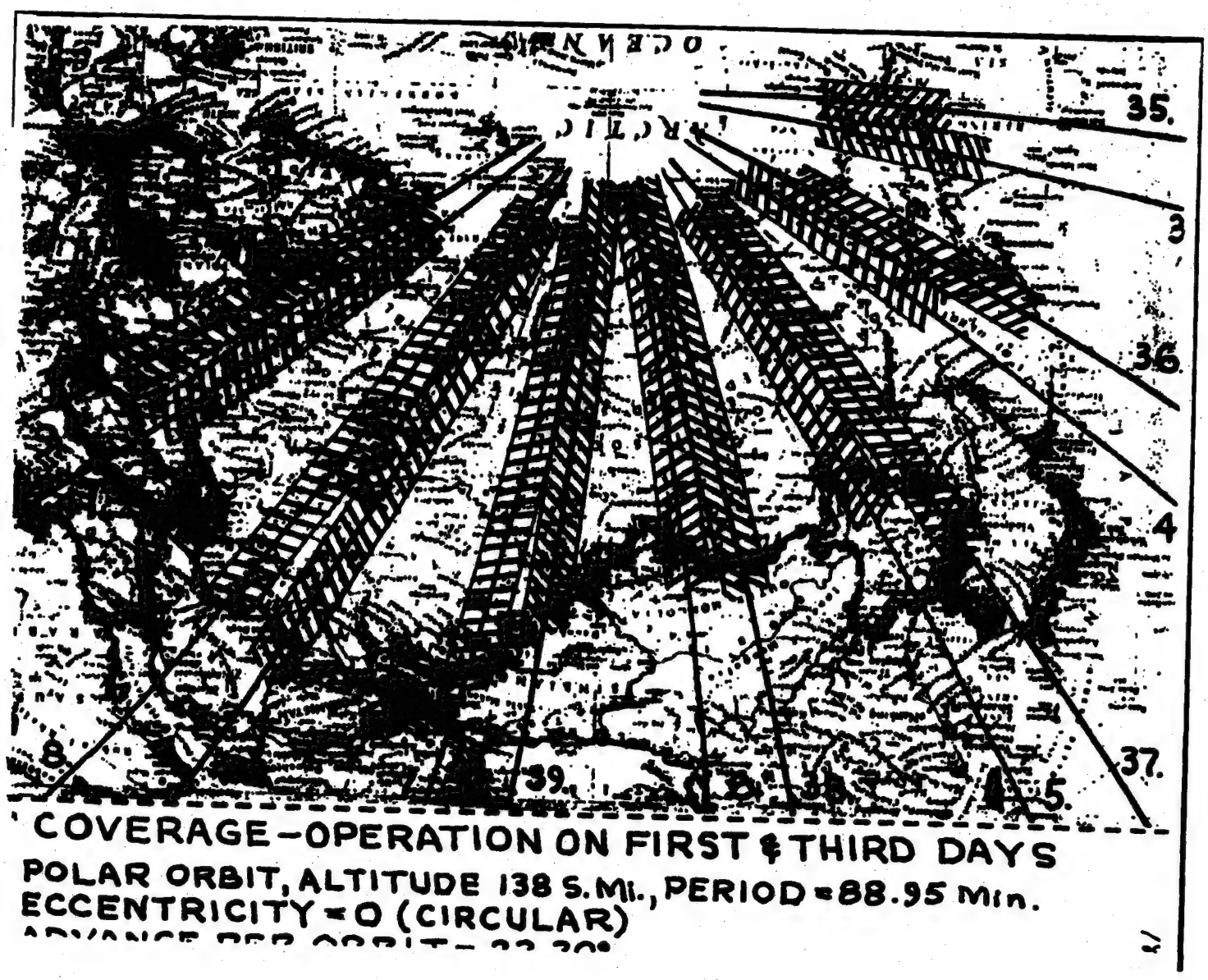
TYPICAL COVERAGE-ONE DAY OPERATION

POLAR ORBIT, ALTITUDE 138 S.Mi., PERIOD = 88.95 Min.
ECCENTRICITY = 0 (CIRCULAR)



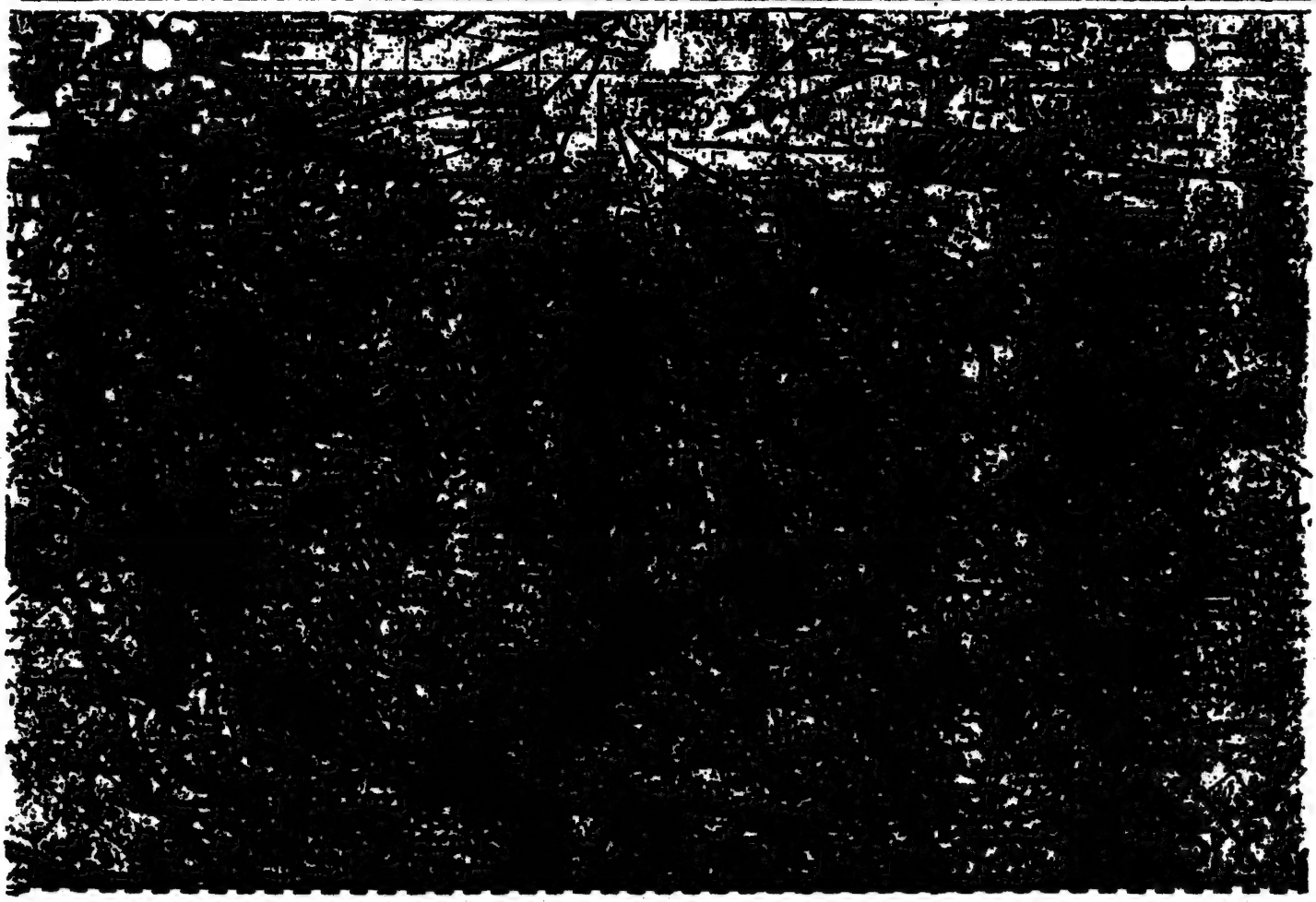
TYPICAL COVERAGE – TWO DAY OPERATION

POLAR ORBIT, ALTITUDE 138 S. Mi., PERIOD = 88.95 Min.
ECCENTRICITY = 0 (CIRCULAR)



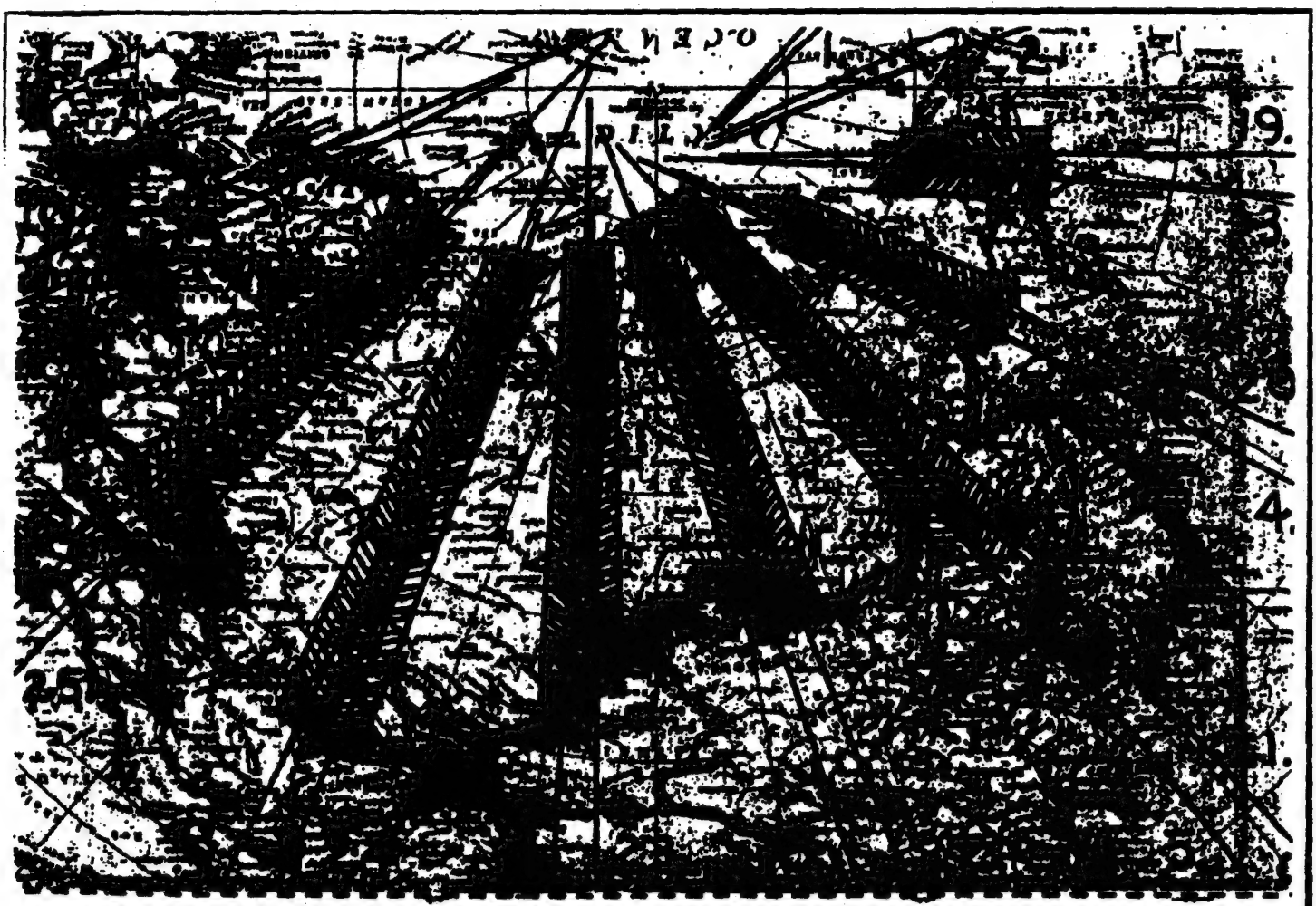
COVERAGE – OPERATION ON FIRST & THIRD DAYS

POLAR ORBIT, ALTITUDE 138 S.Mi., PERIOD = 88.95 Min.
ECCENTRICITY = 0 (CIRCULAR)



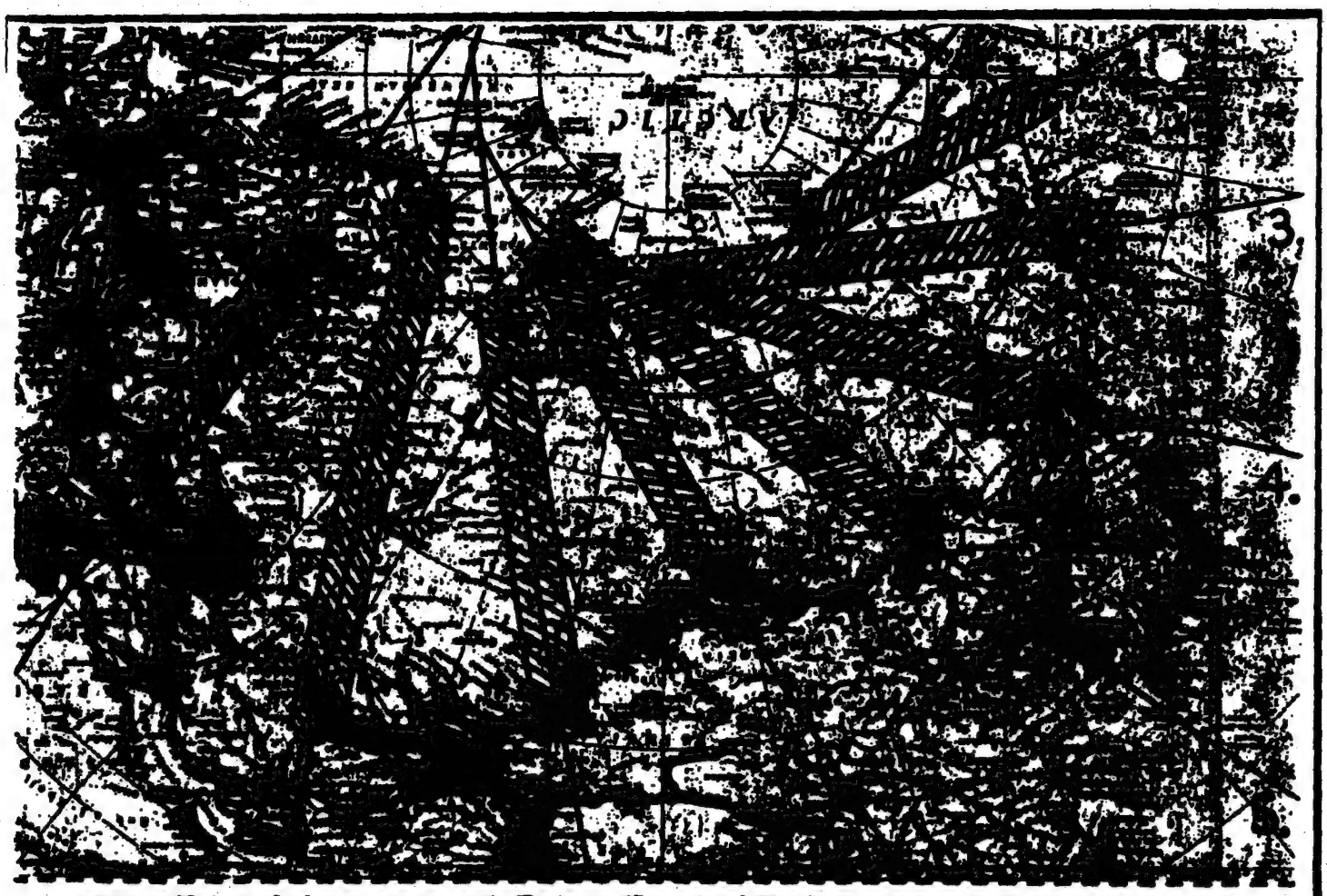
TYPICAL COVERAGE - ONE DAY OPERATION

ORBIT INCLINED — 85° TO EQUATOR, ALTITUDE 138 S. Mi.
ECCENTRICITY = 0, PERIOD = 88.95 Min.



TYPICAL COVERAGE – TWO DAY OPERATION

ORBIT INCLINED = 85° TO EQUATOR, ALTITUDE 138 S. MI.
ECCENTRICITY = 0, PERIOD = 88.95 Min.



TYPICAL COVERAGE-ONE DAY OPERATION

ORBIT INCLINED -75° TO EQUATOR, ALTITUDE 138 S.MI.
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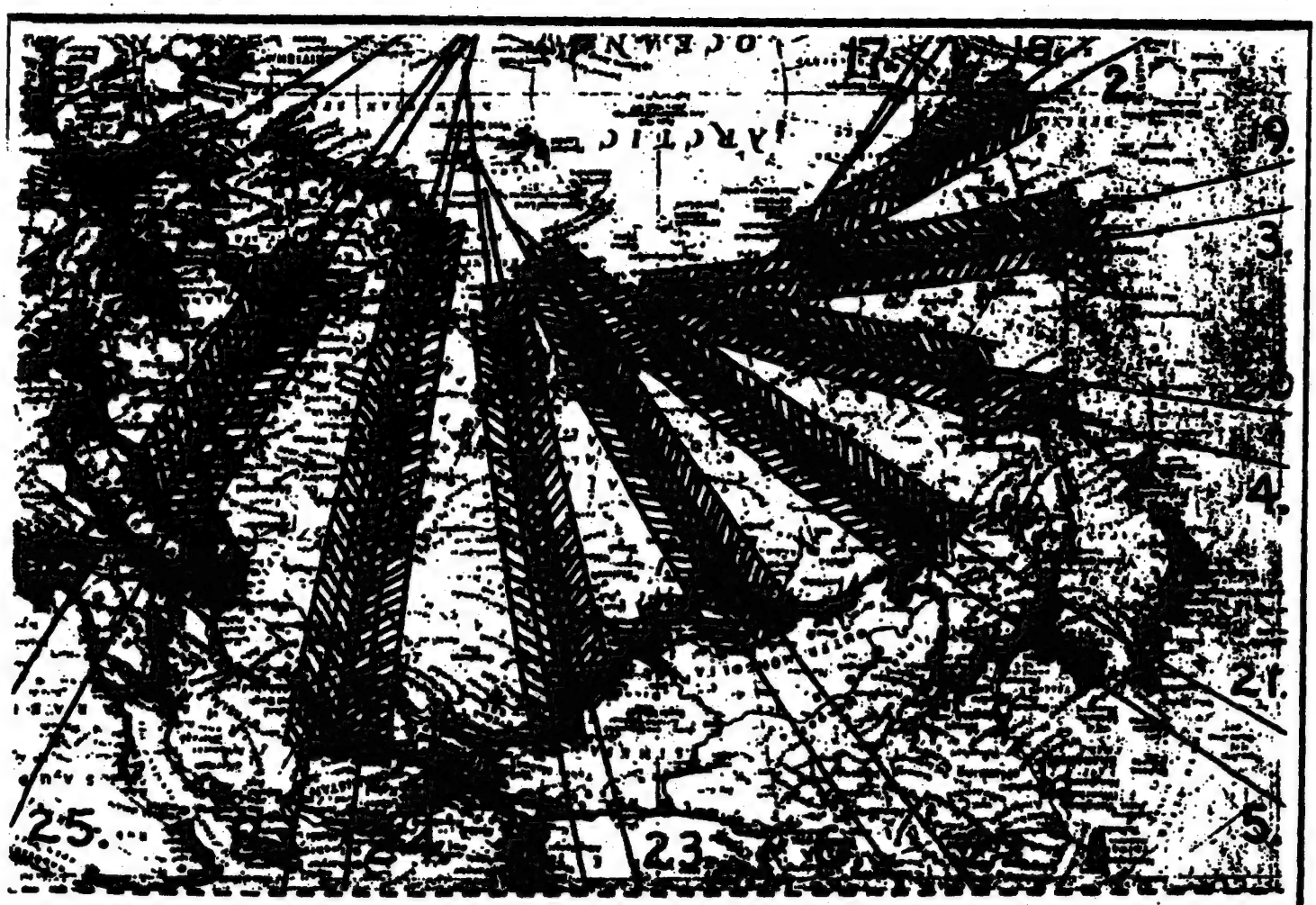
ADVANCE PER ORBIT = 22.30°



TYPICAL COVERAGE - TWO DAY OPERATION

ORBIT INCLINED — 75° TO EQUATOR, ALTITUDE 138 S. MI.
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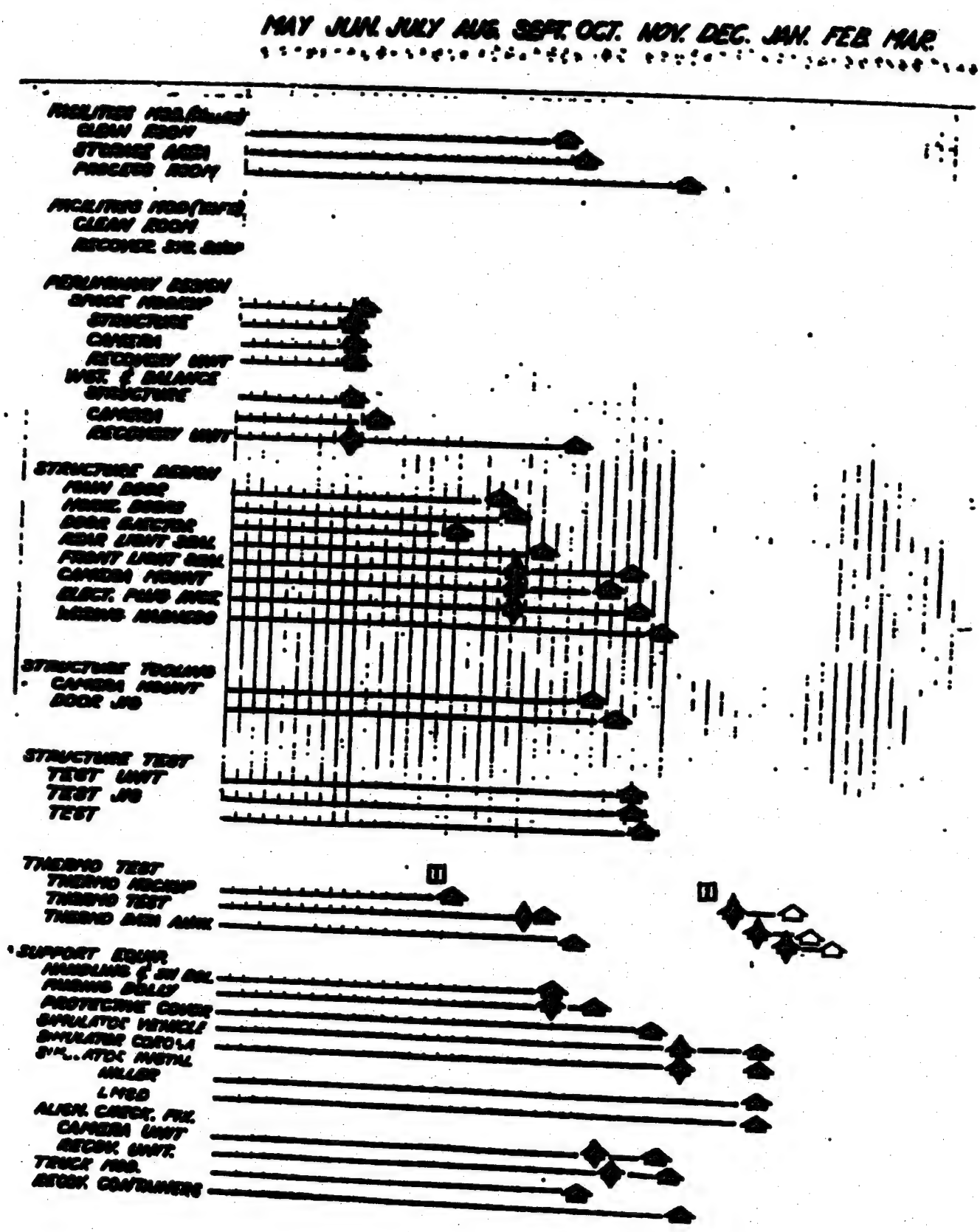
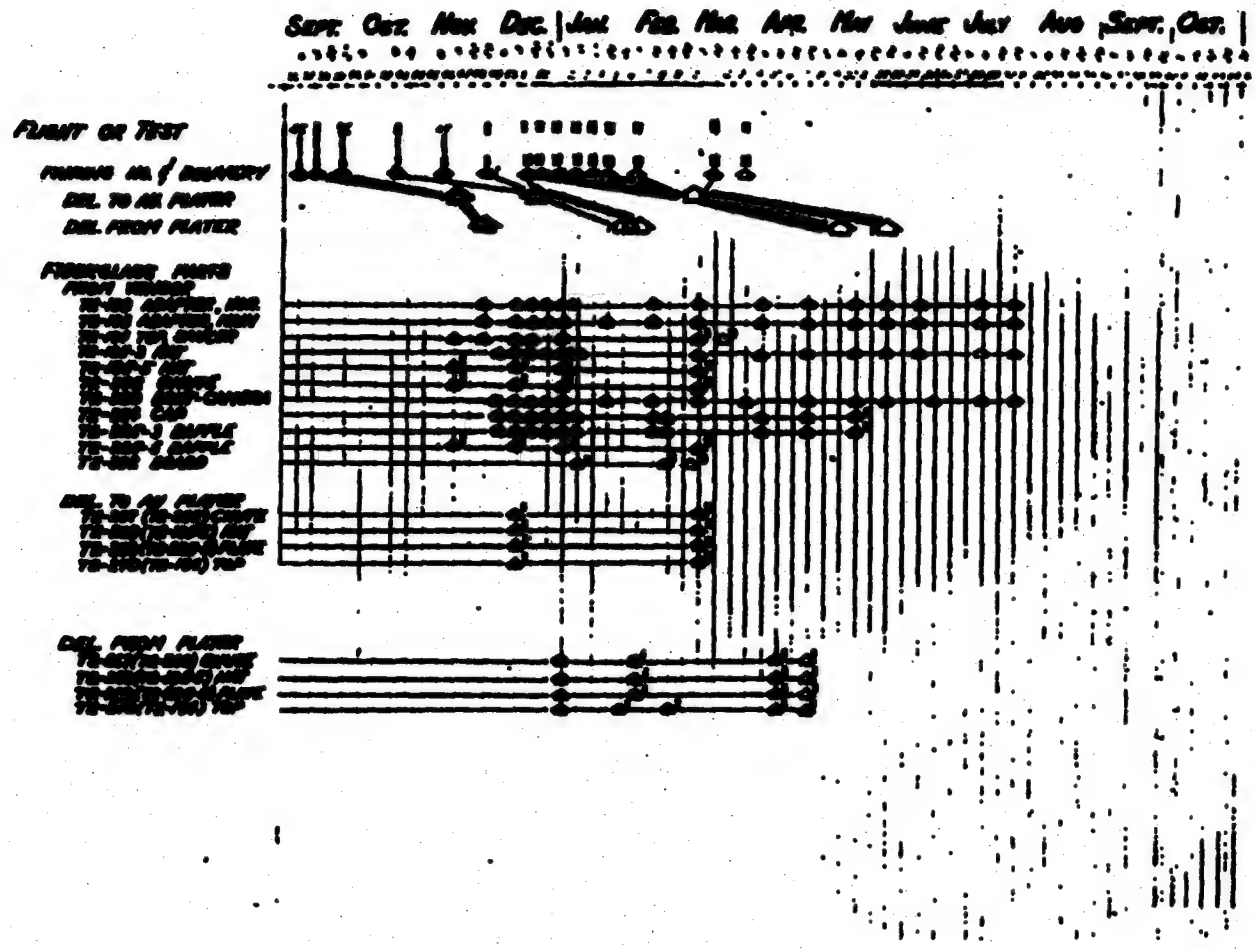
Notice of Page Substitution

Detail Schedules

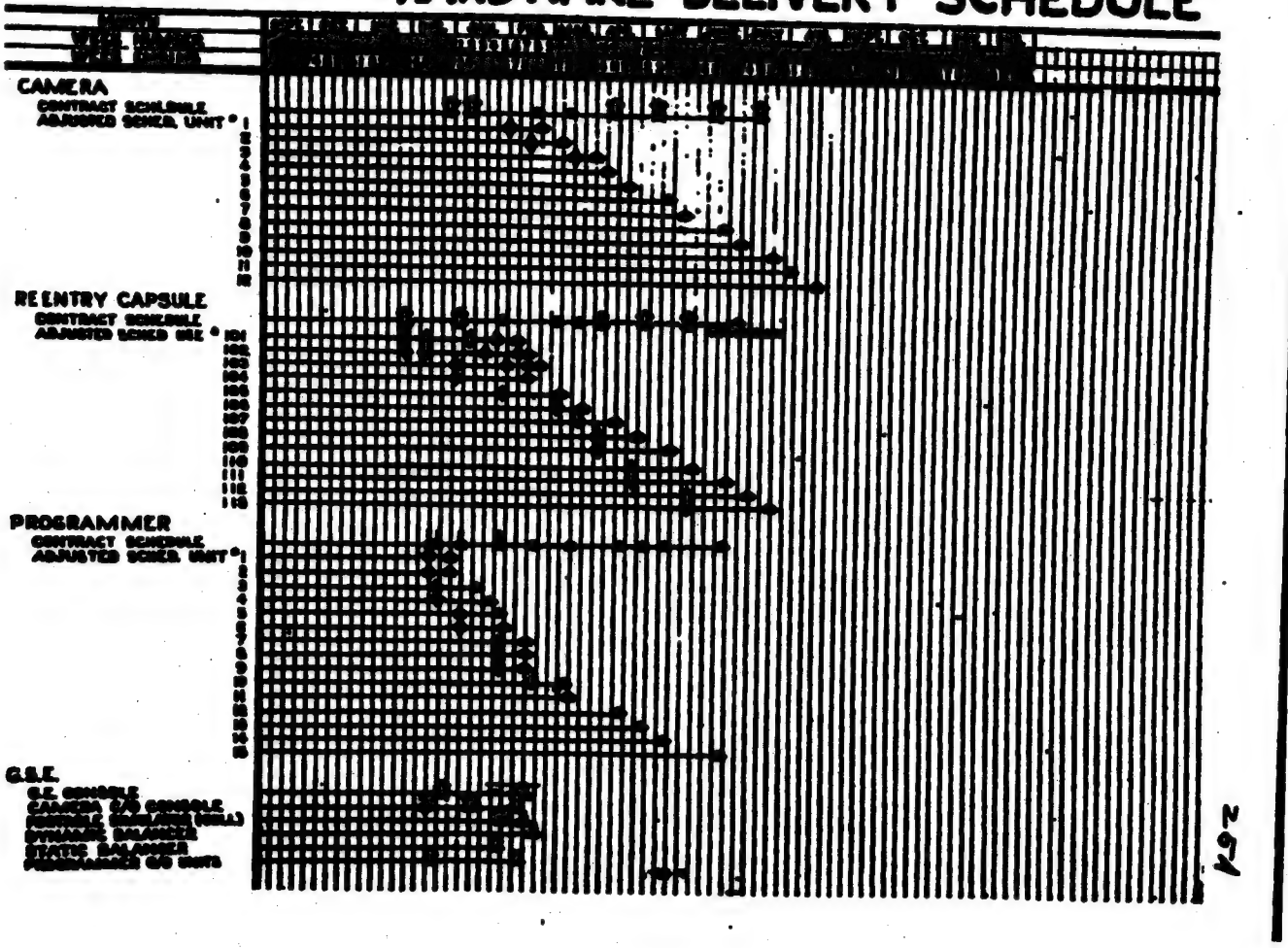
For the purposes of electronic archiving, this page is a substitute for an unscannable page.

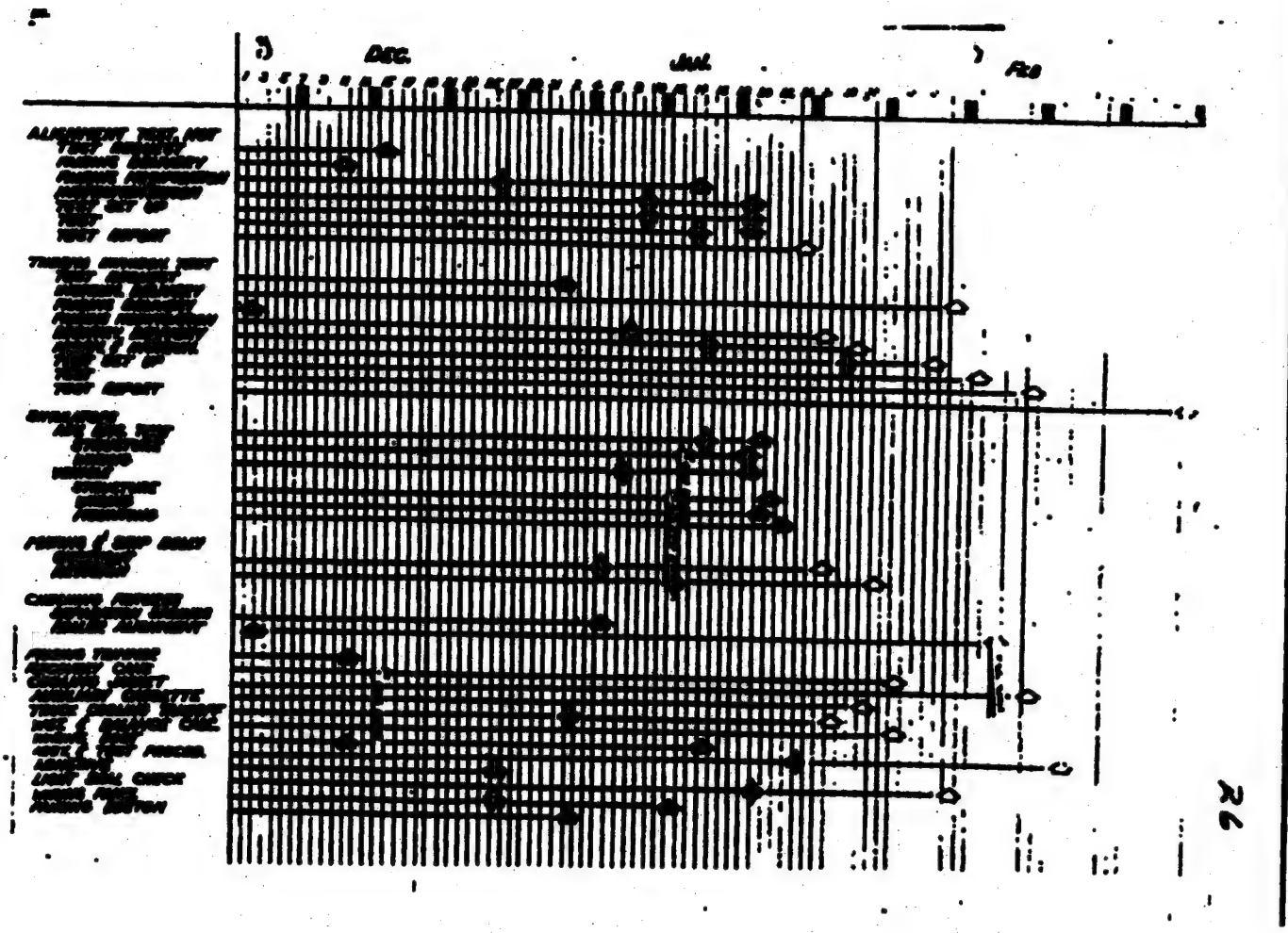

MAY JUN. JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR.
CLEAN ROOM
STORAGE AREA
PROCESS ROOM
CLEAN ROOM
PERIPHERAL REGION
STRUCTURE
CAMERA
RECOVERY UNIT
STRUCTURE
CAMERA
RECOVERY UNIT
STRUCTURE REGION
DOOR ELECTRIC
REAR LIMIT SEAL
FRONT LIMIT SEAL
CAMERA MOUNT
ELECT. PWR MOD.
STRUCTURE TRAILER
CAMERA MOUNT
DOCK JIG
STRUCTURE TEST
TEST UNIT
TEST JIG
TEST
THERMO TEST
THERMO TEST
THERMO MAIN MAIN
SUPPORT EQUIP.
FIXING DOLLY
PROTECTIVE COVER
SIMULATOR VEHICLE
SIMULATOR CONSOLE
LINED
CAMERA UNIT
RECOV. UNIT
TRUCK ASS.
RECOV. CONTAINERS

Delivery & Production Schedule


Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct.
Flight or Test
Finish No. of Gravity
Del. to Air Flight
Del. from Flight
Fuselage Parts
Del. to Air Flight
Del. from Flight

HARDWARE DELIVERY SCHEDULE




Dec.
Jul.
Feb

Notice of Page Substitution

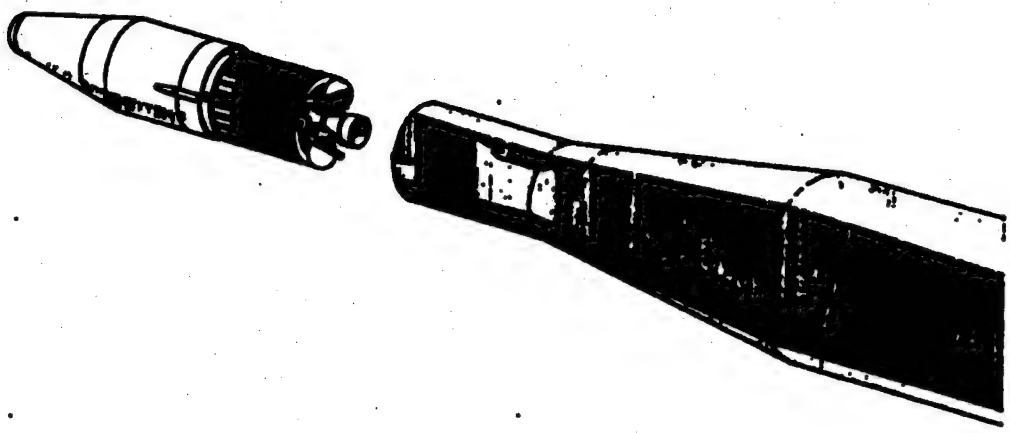
Vehicle

For the purposes of electronic archiving, this page is a substitute for an unscannable page.

~~CONFIDENTIAL~~

SENTRY ORBITAL TEST VEHICLE

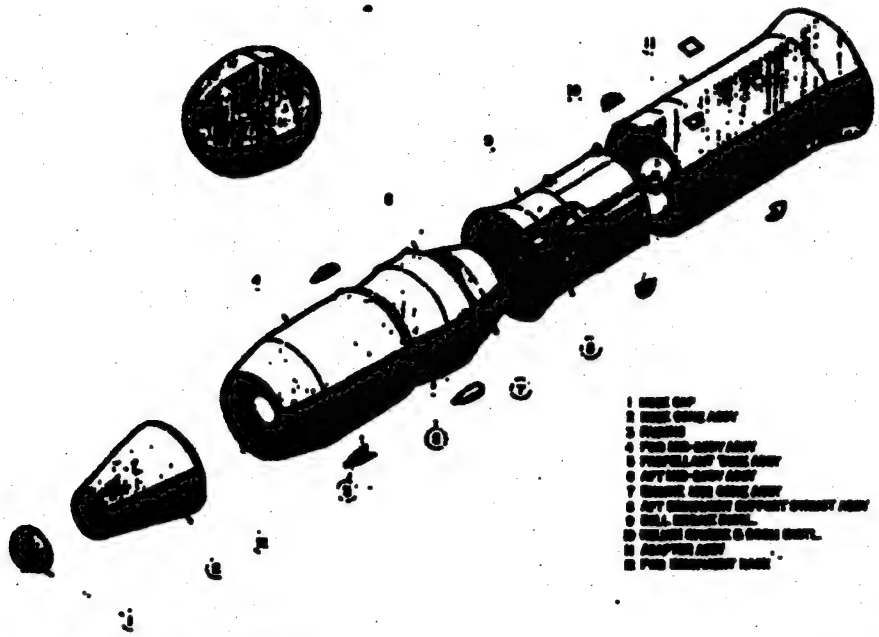
BOOSTER SEPARATION



~~CONFIDENTIAL~~ [redacted]

~~CONFIDENTIAL~~

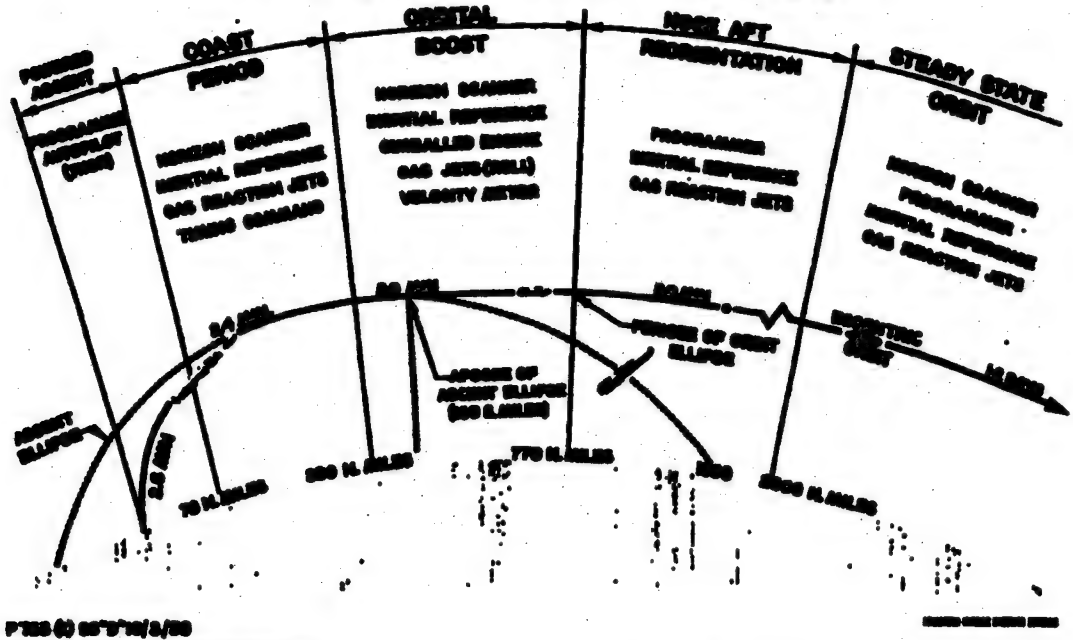
SENTRY STRUCTURAL BREAKDOWN



~~CONFIDENTIAL~~ [redacted]

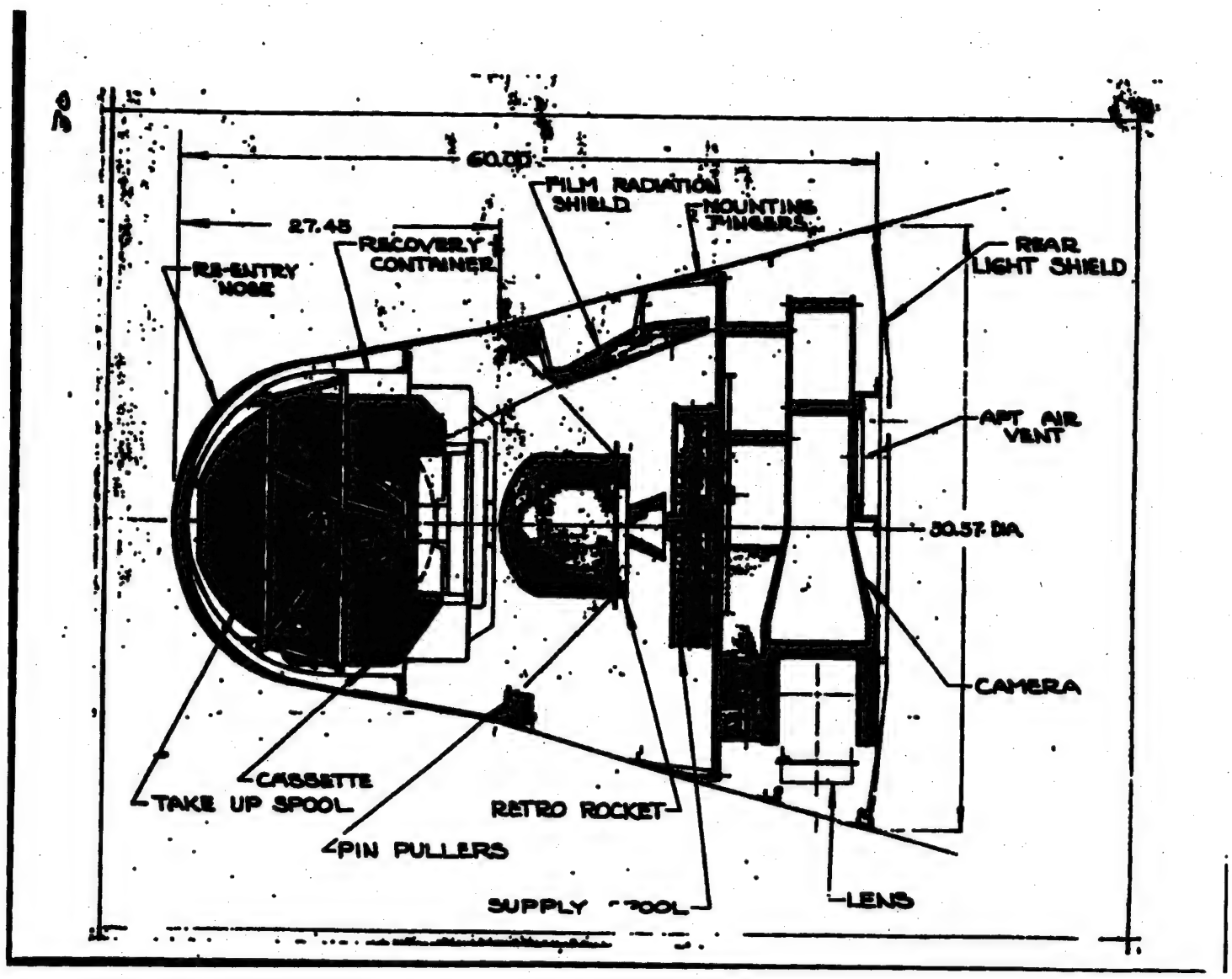
GUIDANCE & CONTROL SYSTEM

TYPICAL SENTRY ASCENT (THOR-PROG IIA)

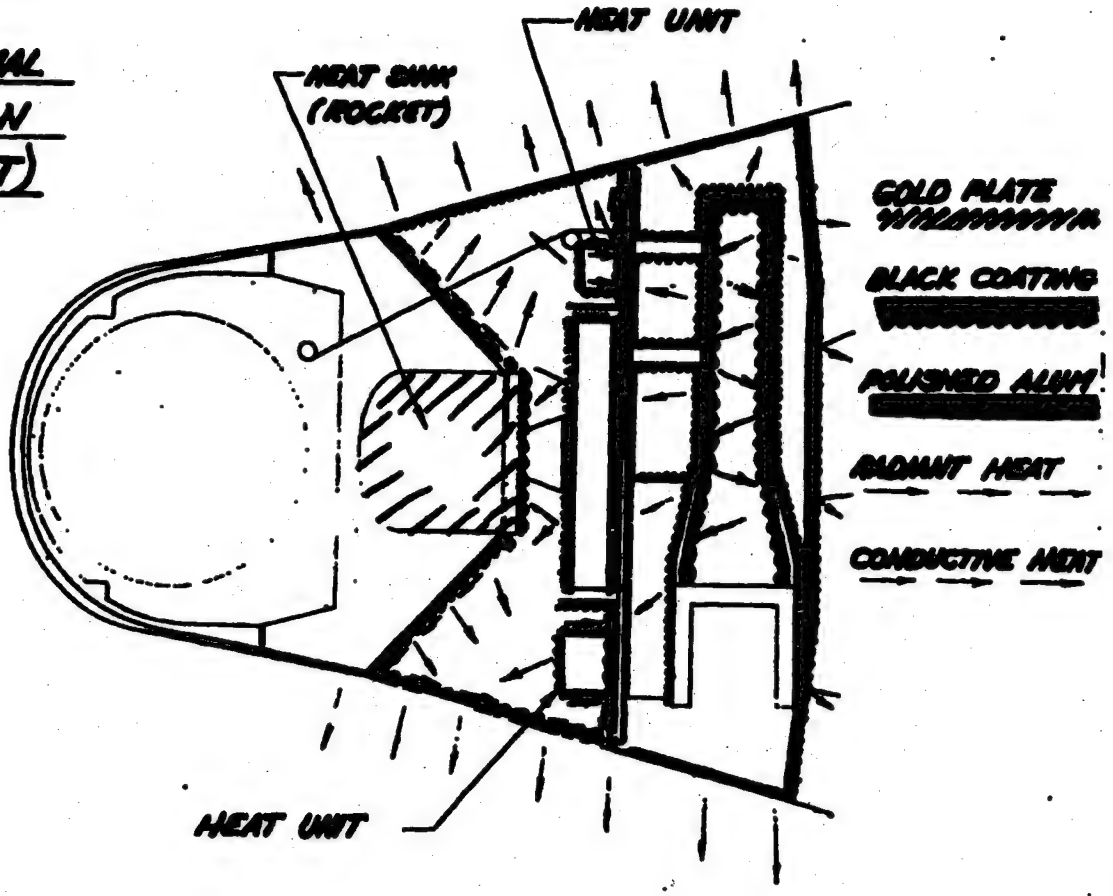


WD-59-09944

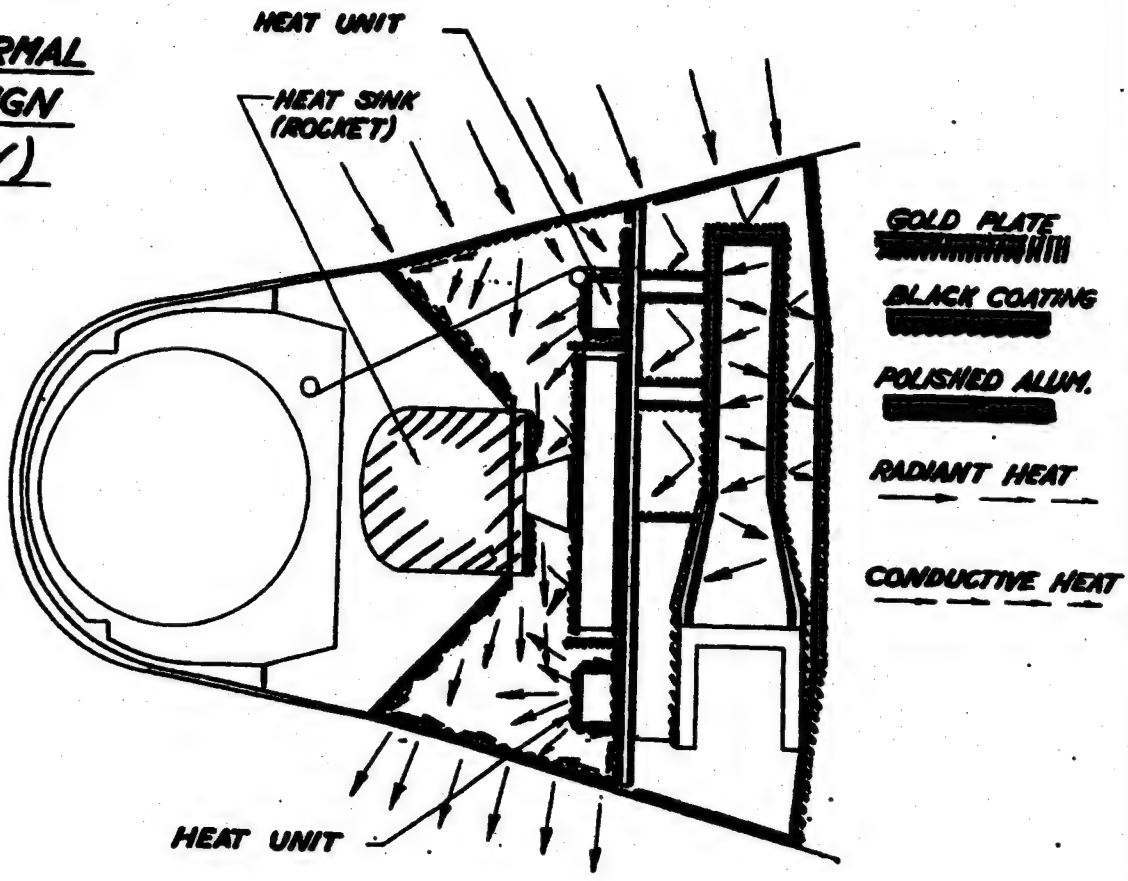
•Y45


60.00
27.45
FILM RADIATION SHIELD
MOUNTING FINGERS
RECOVERY CONTAINER
RE-ENTRY NOSE
REAR LIGHT SHIELD
APT AIR VENT
30.57 DIA
CAMERA
CASSETTE
TAKE UP SPOOL
RETRO ROCKET
PIN PULLERS
SUPPLY SPOOL
LENS

THERMAL DESIGN (NIGHT)



THERMAL DESIGN (DAY)



WEIGHT SUMMARY - RECONNAISSANCE SYSTEM

ITEM	SER. 22	SER. 23
[illegible] & ACCESSORIES	13.9	13.9
THERMAL INSULATION	4.	4.
INERT SHIELDS & DOORS	4.	4.
VIEWING SCOPE (PERIS SCR & MONITOR)	5.7	5.7
T/R CONTROL & [illegible]	4.	4.
MISCELLANEOUS MECHANICAL	2.	2.
WIRE, CONNECTORS, CLAMPS, ETC.	4.9	6.
CAMERA (INCLUDES 2 ZOOM SCANNERS)	80.3	80.
CASSETTE	22.5	22.5
FILM	20.	20.
NEGATIVE CHECK ASSY.	84.5	87.5
REVIEW ASSY.	73.5	73.5
RECOVERY SYSTEM	62.5	62.5
TOTAL	401.8	413.6

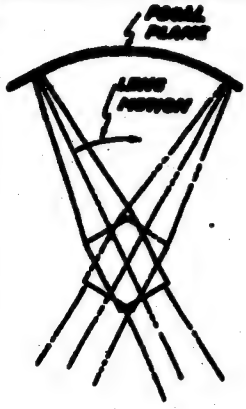
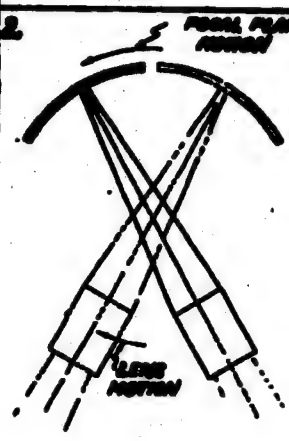
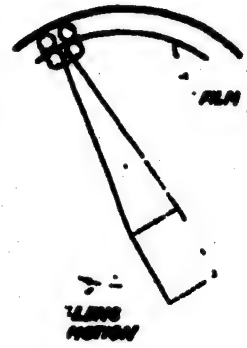
33 REV.

Notice of Page Substitution

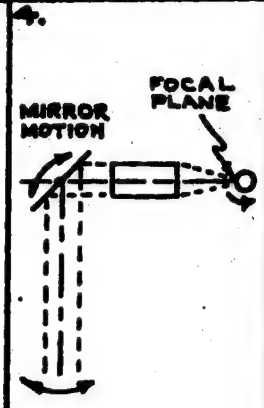
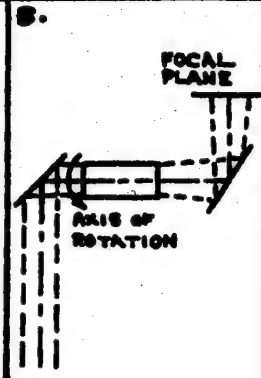
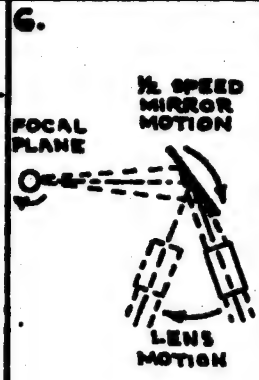
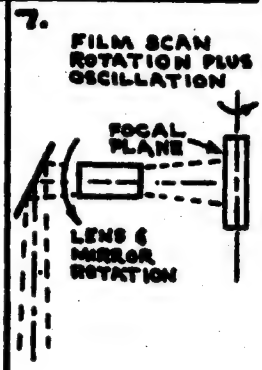
Camera

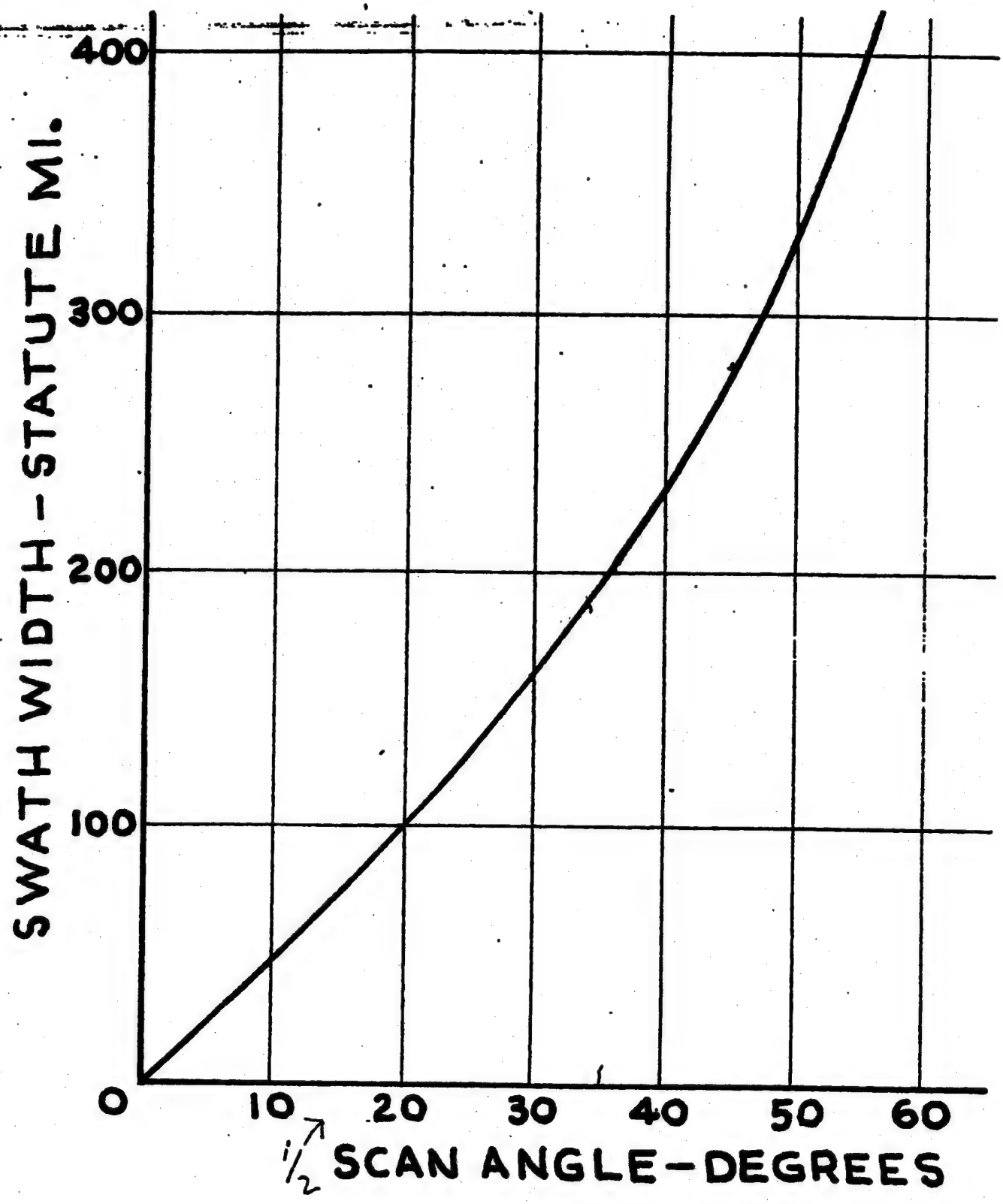
For the purposes of electronic archiving, this page is a substitute for an unscannable page.

COMPARISON TABLE PANORAMIC CAMERA TYPES

CRITERIA	PANORAMIC CAMERA TYPE		
	NYAC CAMERA	REVERSE FOCAL PLANE CAMERA	MODIFIED NYAC CAMERA
PRIMARY CRITERIA 1. SIMPLICITY AND RELIABILITY	MOST SIMPLE HIGH RELIABILITY	SIMPLE GOOD RELIABILITY	FAIRLY SIMPLE GOOD RELIABILITY
2. INHERENT RESOLUTION CAPABILITIES	EXCELLENT	GOOD	FAIR
3. MINIMUM WEIGHT AND POWER	MODERATE	MODERATE	LOW
SECONDARY CRITERIA 1. CONFIGURATION ADAPTABILITY	GOOD	GOOD	GOOD
2. GROWTH POTENTIAL	POOR	GOOD	GOOD
TECHNICAL SKETCH	1. 	2. 	3. 

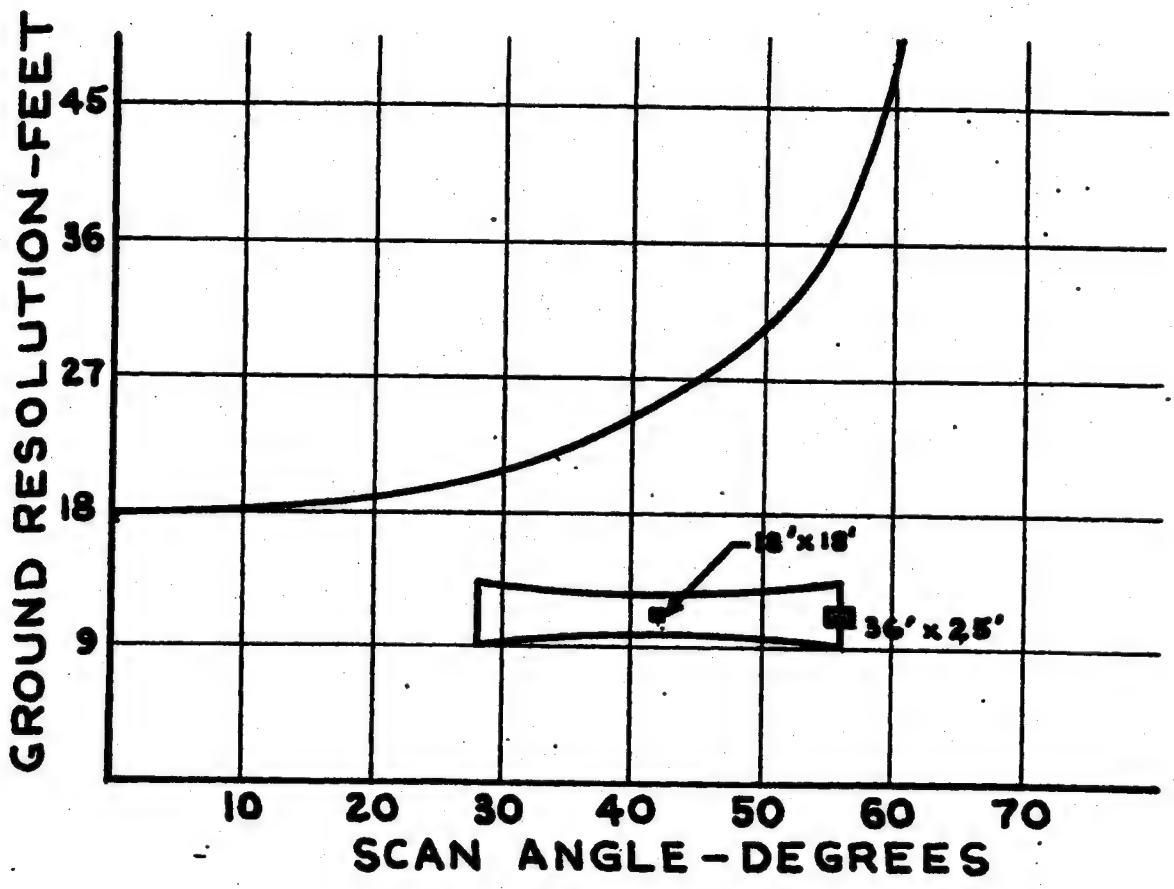
COMPARISON TABLE PANORAMIC CAMERA TYPES

CRITERIA	PANORAMIC CAMERA TYPE			
	OSCILLATING MIRROR CAMERA	MODIFIED B2 CAMERA	NODDING LENS CAMERA	MODIFIED PURE ROTARY CAMERA
PRIMARY CRITERIA 1. SIMPLICITY AND RELIABILITY	FAIRLY SIMPLE Good RELIABILITY	COMPLEX Good RELIABILITY	VERY COMPLEX POOR RELIABILITY	COMPLEX FAIR RELIABILITY
2. INHERENT PERFORMANCE CAPABILITIES	FAIR	GOOD	POOR	FAIR
3. MINIMUM WEIGHT AND POWER	HIGH	HIGH	HIGH	HIGH
SECONDARY CRITERIA 1. CONFIGURATION ADAPTABILITY	POOR	FAIR	EXCELLENT	POOR
2. GROWTH POTENTIAL	POOR	GOOD	GOOD	POOR
TECHNIQUE SKETCH	4. 	5. 	6. 	7. 



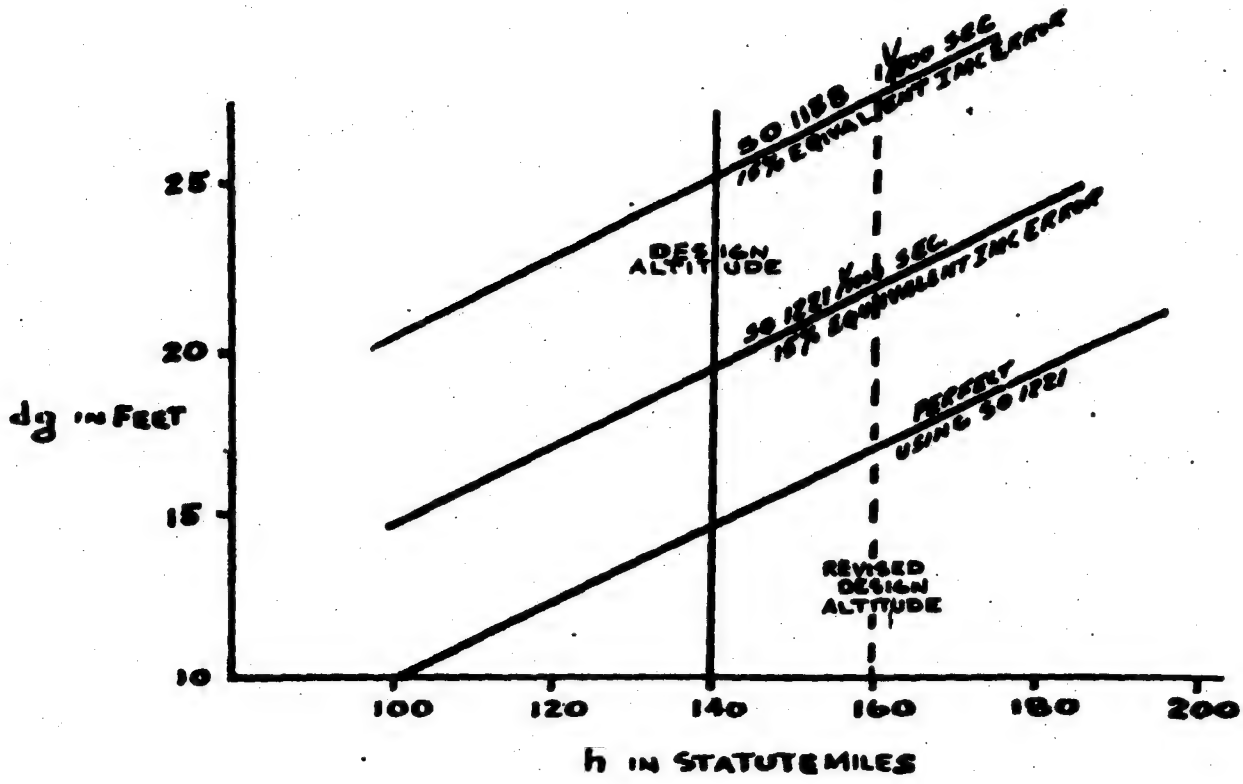
SWATH WIDTH Vs SCAN ANGLE

DJ 1405 M



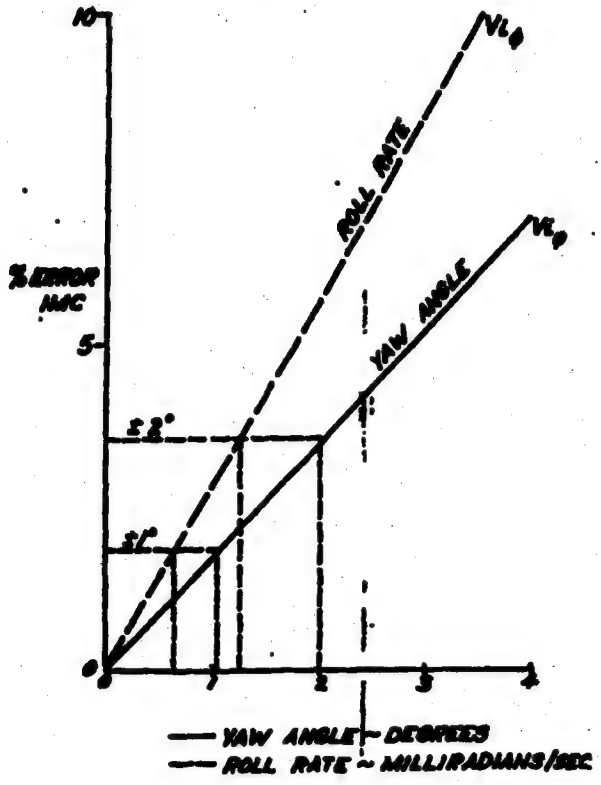
GROUND RESOLUTION Vs SCAN ANGLE

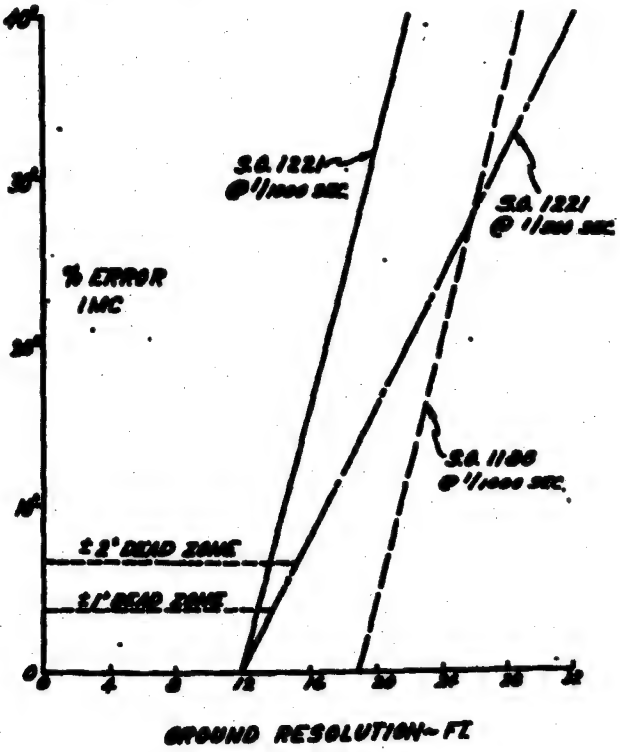
GROUND RESOLUTION vs. ALTITUDE

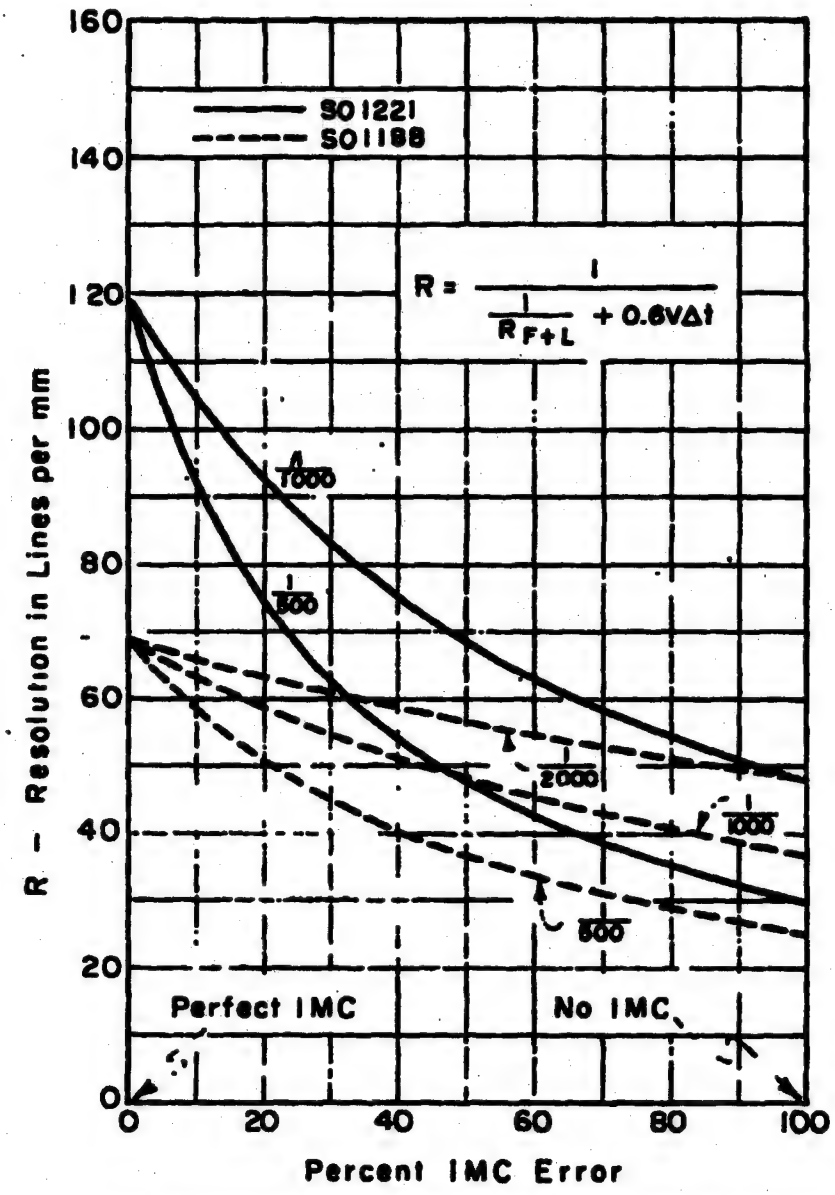


CONTROL SYSTEM CHARACTERISTICS

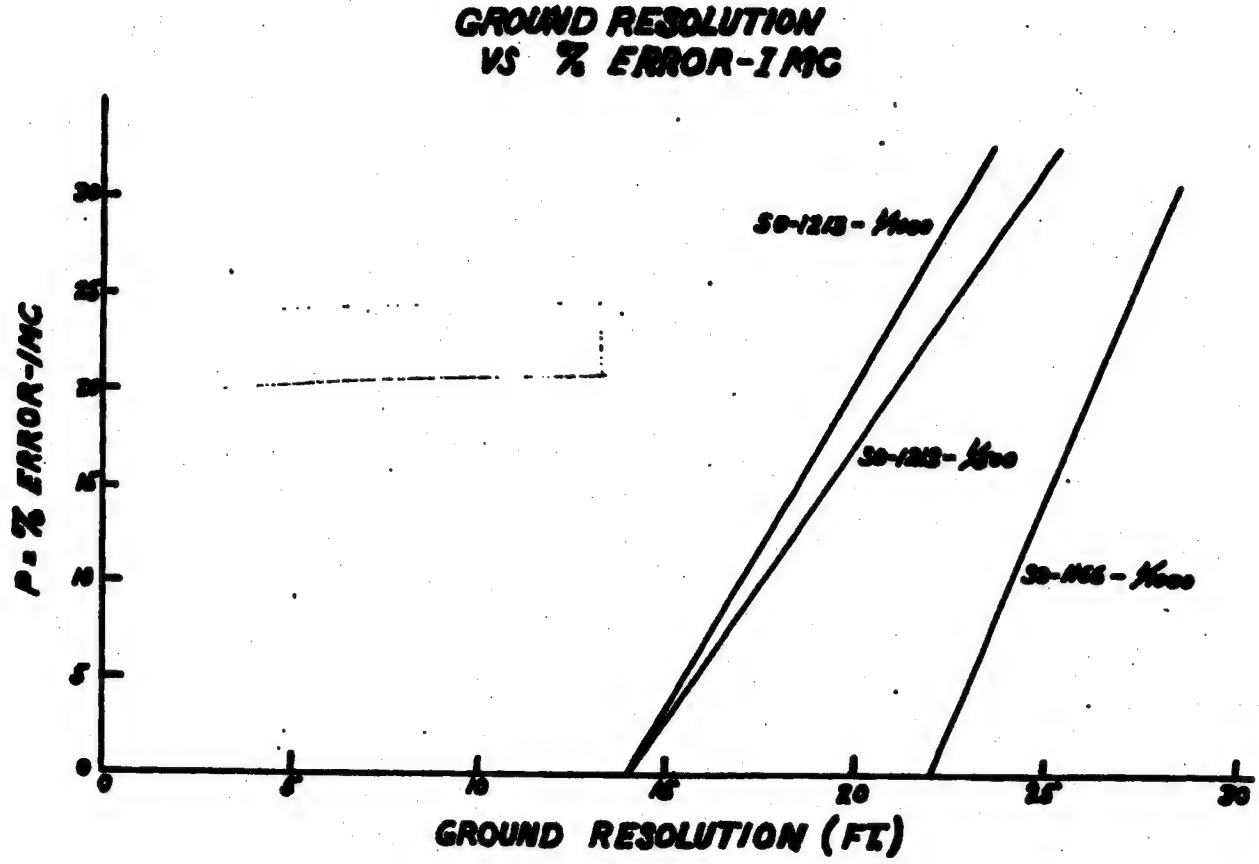
DESIGN GOAL: ±1° DEAD ZONE, TOTAL % IMC ERROR = 3.4%
EXPECTED: ±2° DEAD ZONE, TOTAL % IMC ERROR = 6.9%

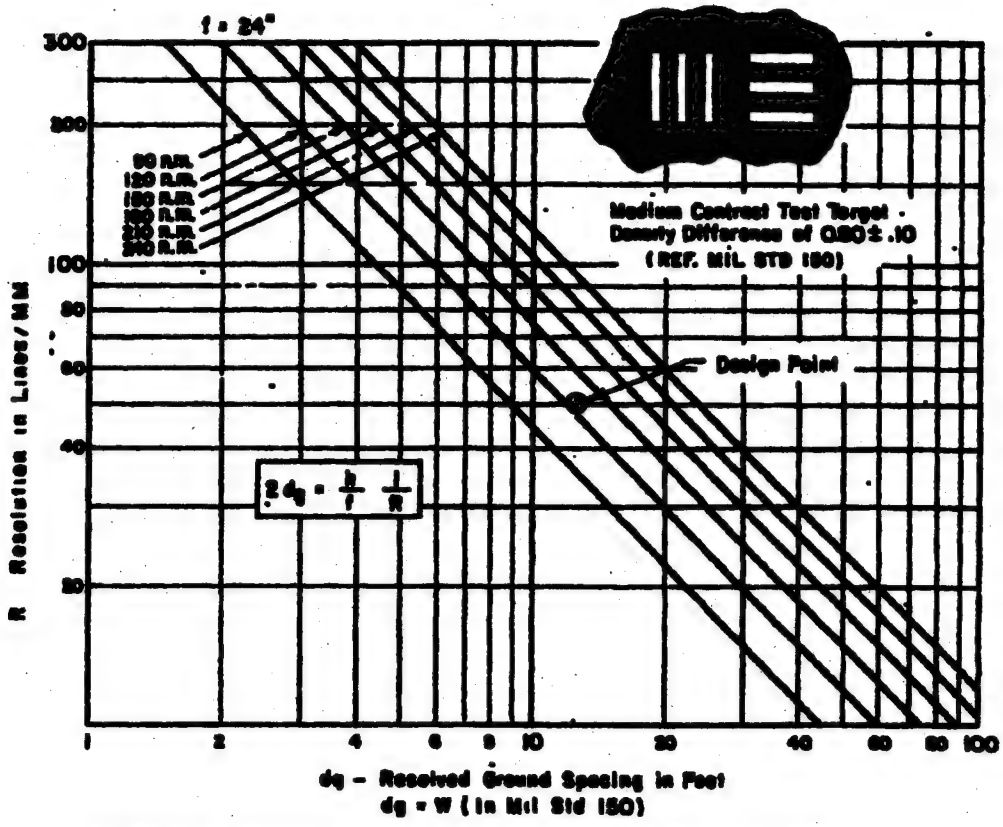




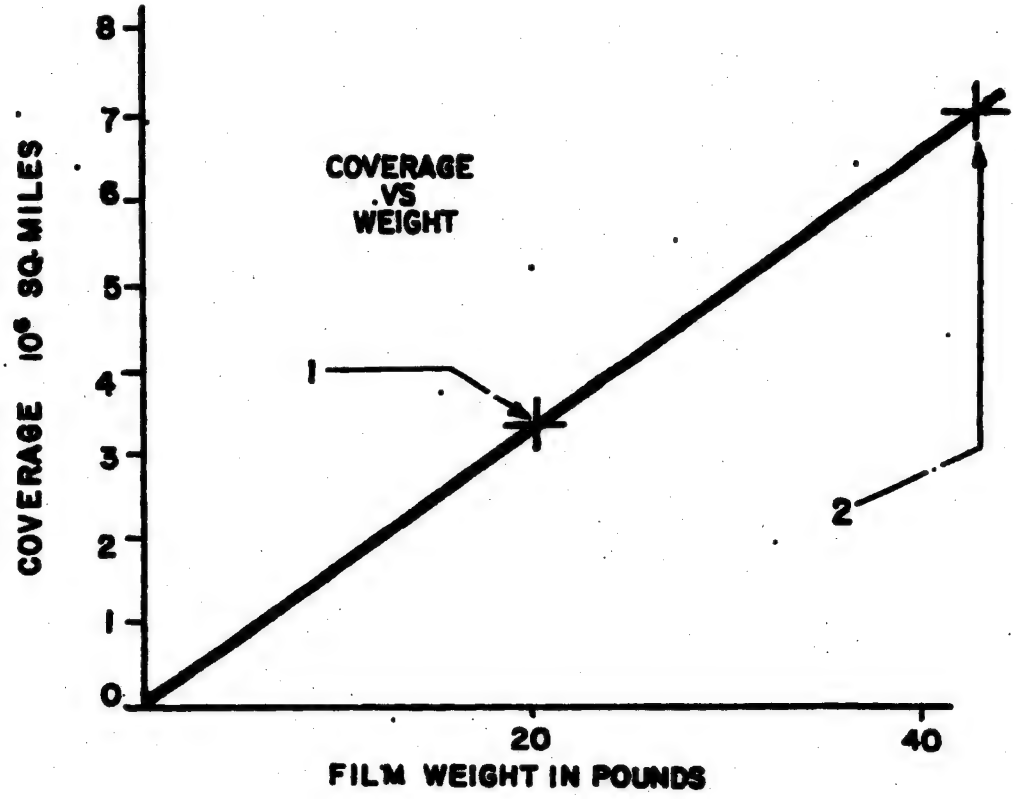


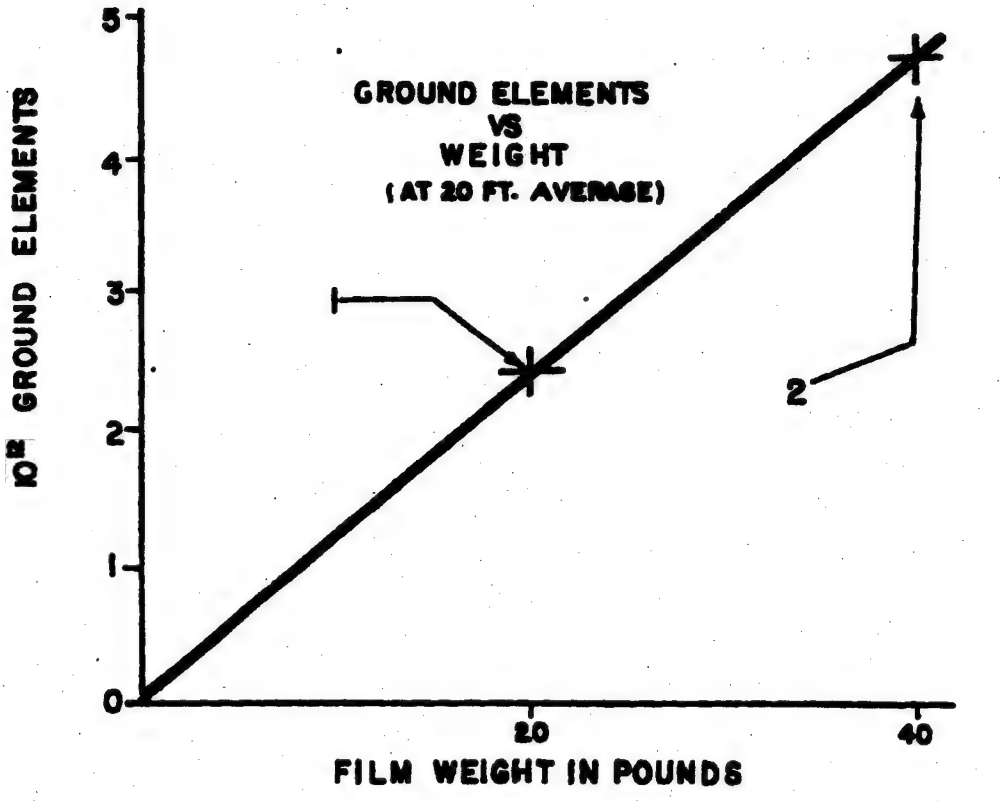
RESOLUTION vs. PERCENT IMAGE MOTION COMPENSATION ERROR FOR EK SO 1188 AND EK SO 1221


GROUND RESOLUTION
VS % ERROR-IMC
P = % ERROR-INC
GROUND RESOLUTION (FT.)



RESOLVED GROUND SPACING vs. CAMERA RESOLUTION


COVERAGE VS WEIGHT
COVERAGE 10^6 SQ. MILES
0
1
2
3
4
5
6
7
8
20
40
FILM WEIGHT IN POUNDS
1
2


GROUND ELEMENTS VS WEIGHT (AT 20 FT. AVERAGE)
10^8 GROUND ELEMENTS
0
1
2
3
4
5
20
40
FILM WEIGHT IN POUNDS
1
2

1965

HYAC II CAMERA PARAMETERS

[redacted] - 135 n. miles

[redacted] - ± 35° from nadir

[redacted] - Focal length 24 inches, f/5

high acuity, low distortion, resolution

160 lines per mm, Fiducial Reticule

Film - 70 mm film base (3 1/2 mil)

SO-1188 and SO-1212

Exposure - 1/500, 1/1000, 1/2000 sec.

Capacity - 7000 feet of film (10 min.)

total track through 180°

Overlap - 10% at design altitude

[redacted] - 90% over-all.

[redacted] - variable by change in 5% steps to ± 80% from

design, and in one 20% step to ± 40%

Operational Environment - Unless pre-pressurized

temperature 70° ± 20° F

Accuracy of Location - one mile over-all.

Auxiliary Data - Unless time to 0.1 sec., unless time

basis for determination of base velocity,

port and starboard horizons for determination

of pitch and roll to 0.1°

[redacted] - to 0.1° by insertion of [redacted] in

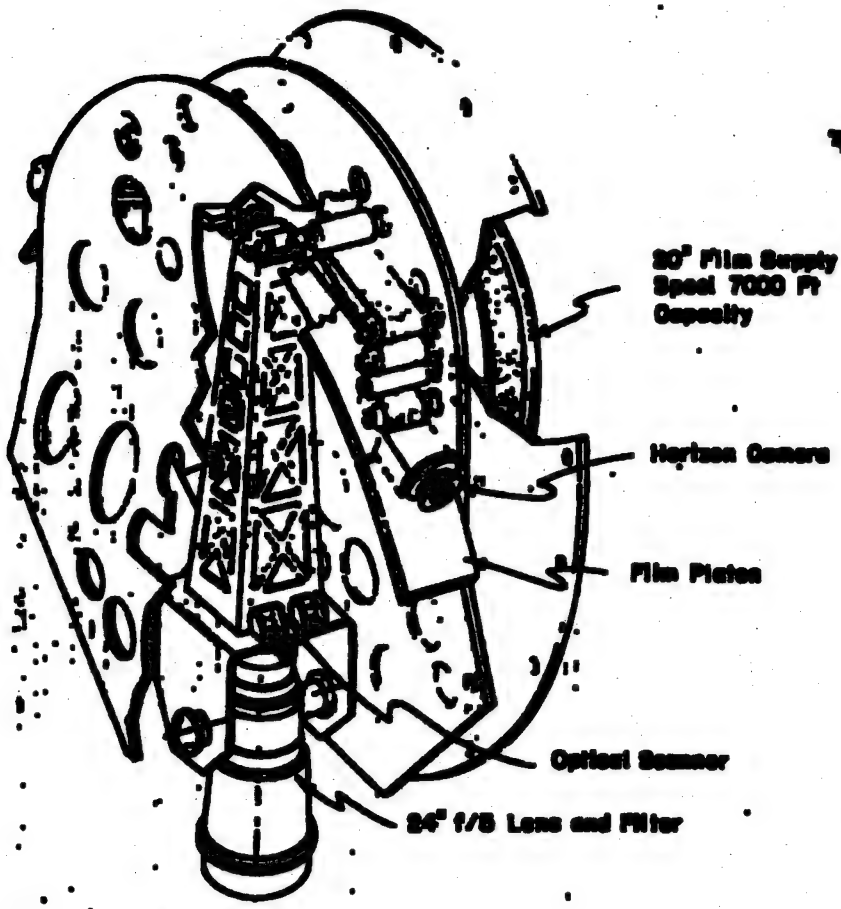
overlap region

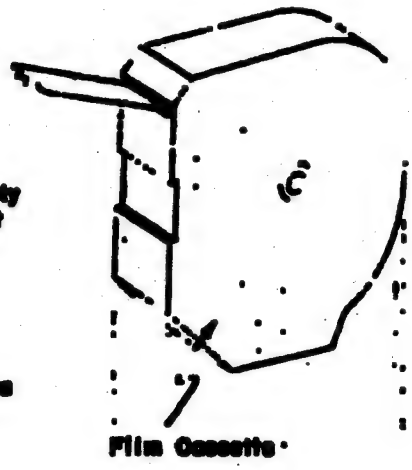
Weight - Camera, [redacted] with cover,

and intervalometer 92.5 lbs.

Take-up cassette 12.5 lbs.

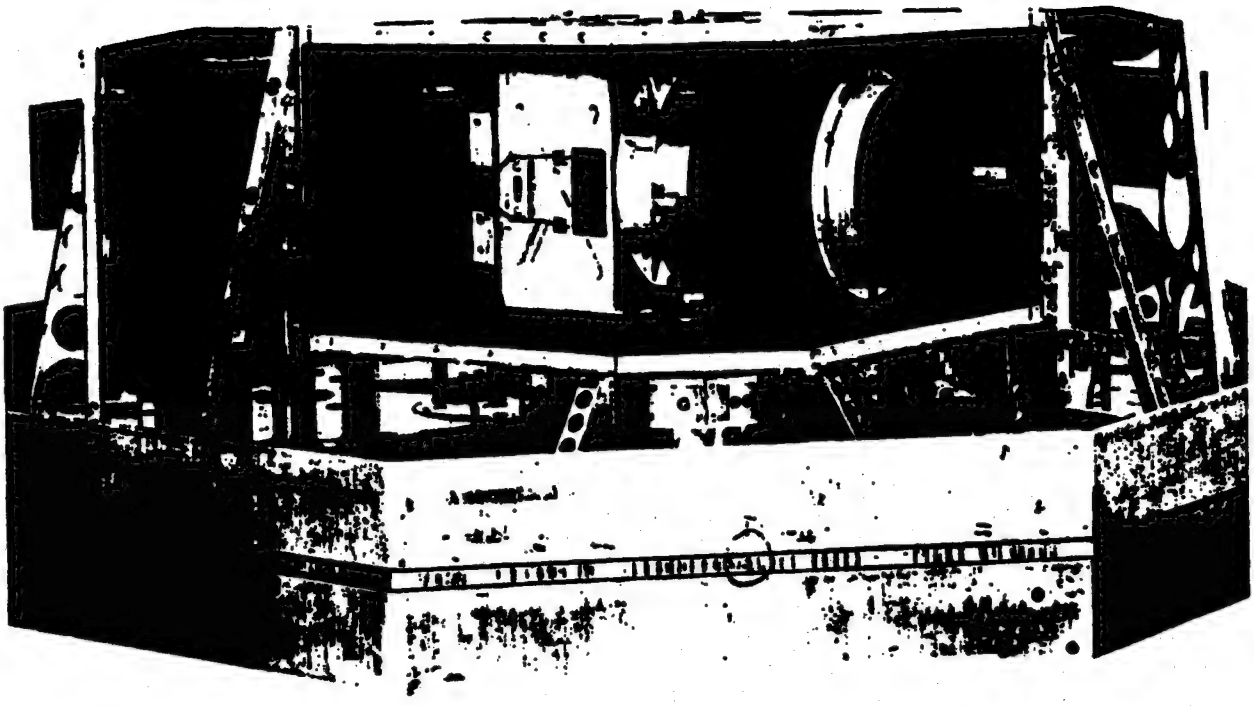
44



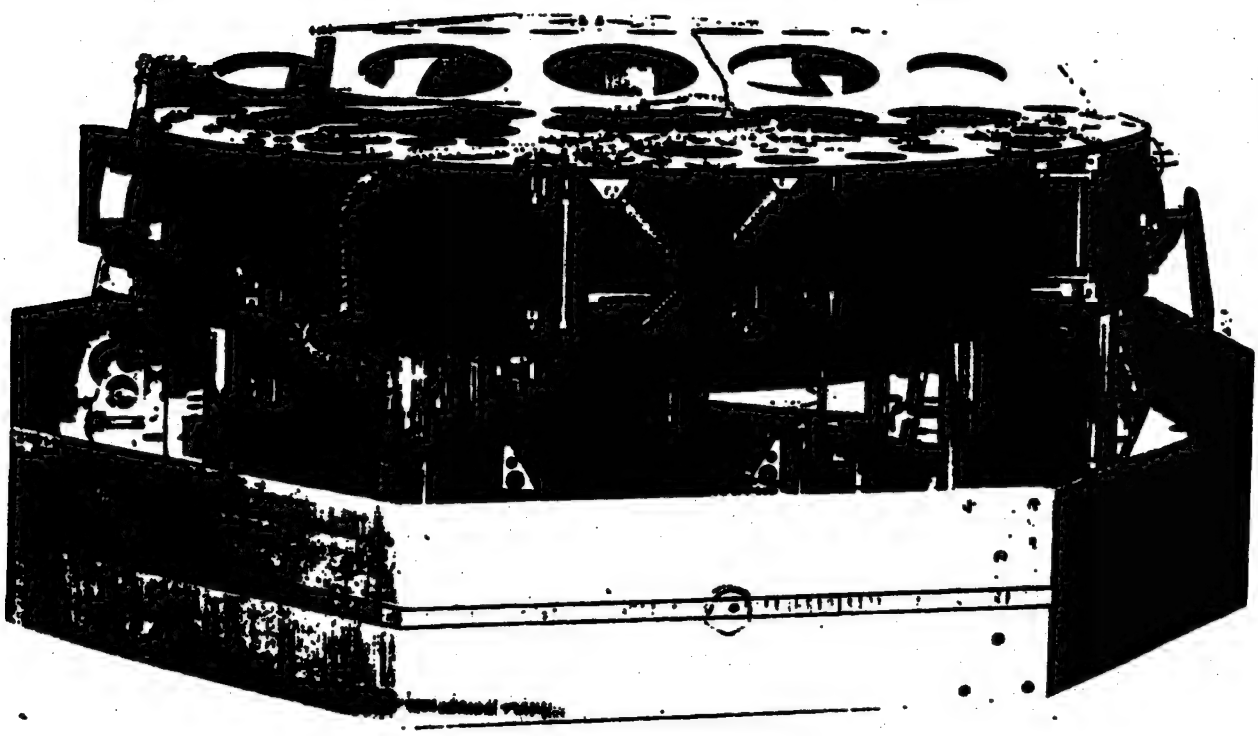


HYAC II

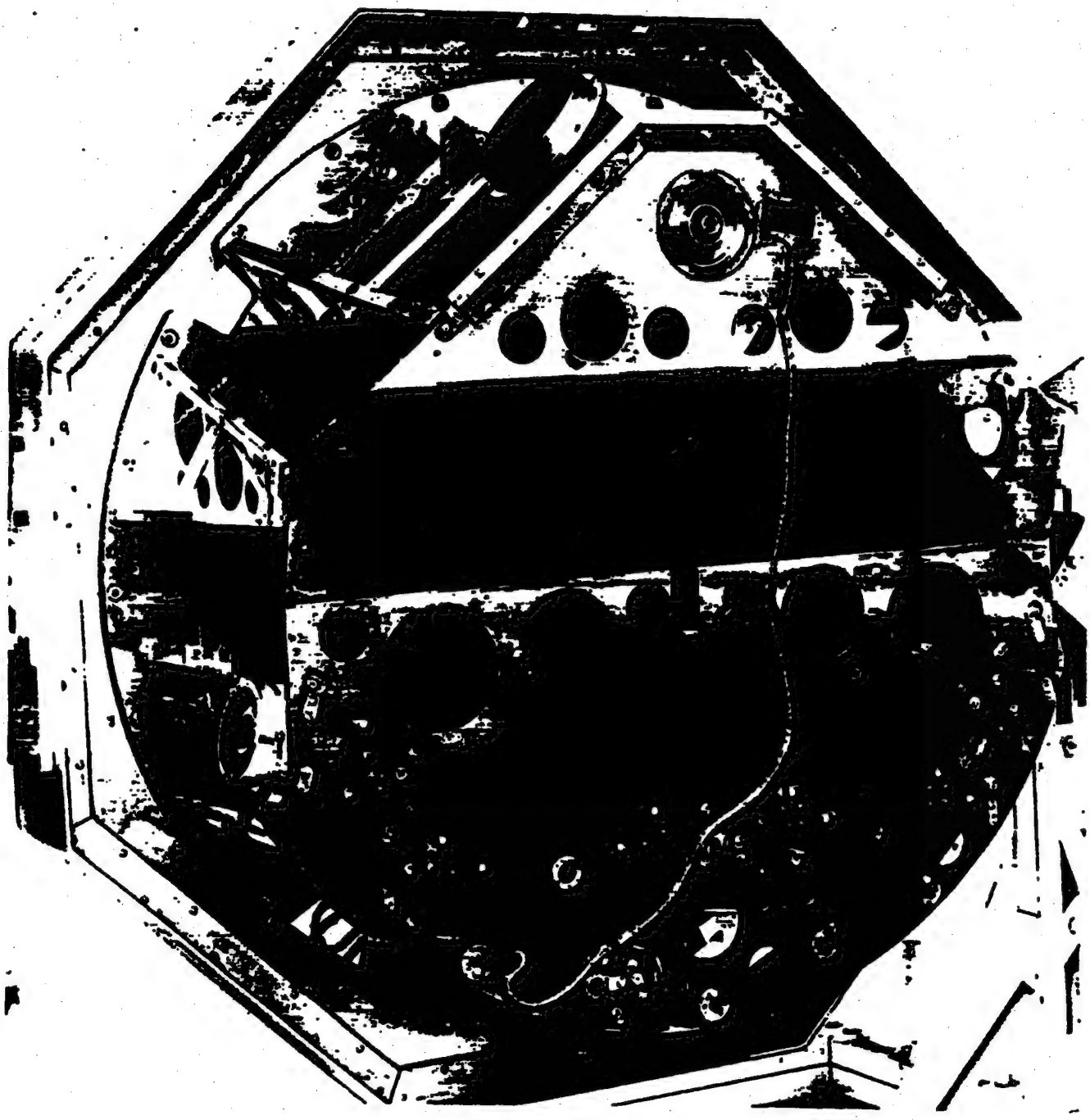
HIGH ACUITY CAMERA AND CASSETTE



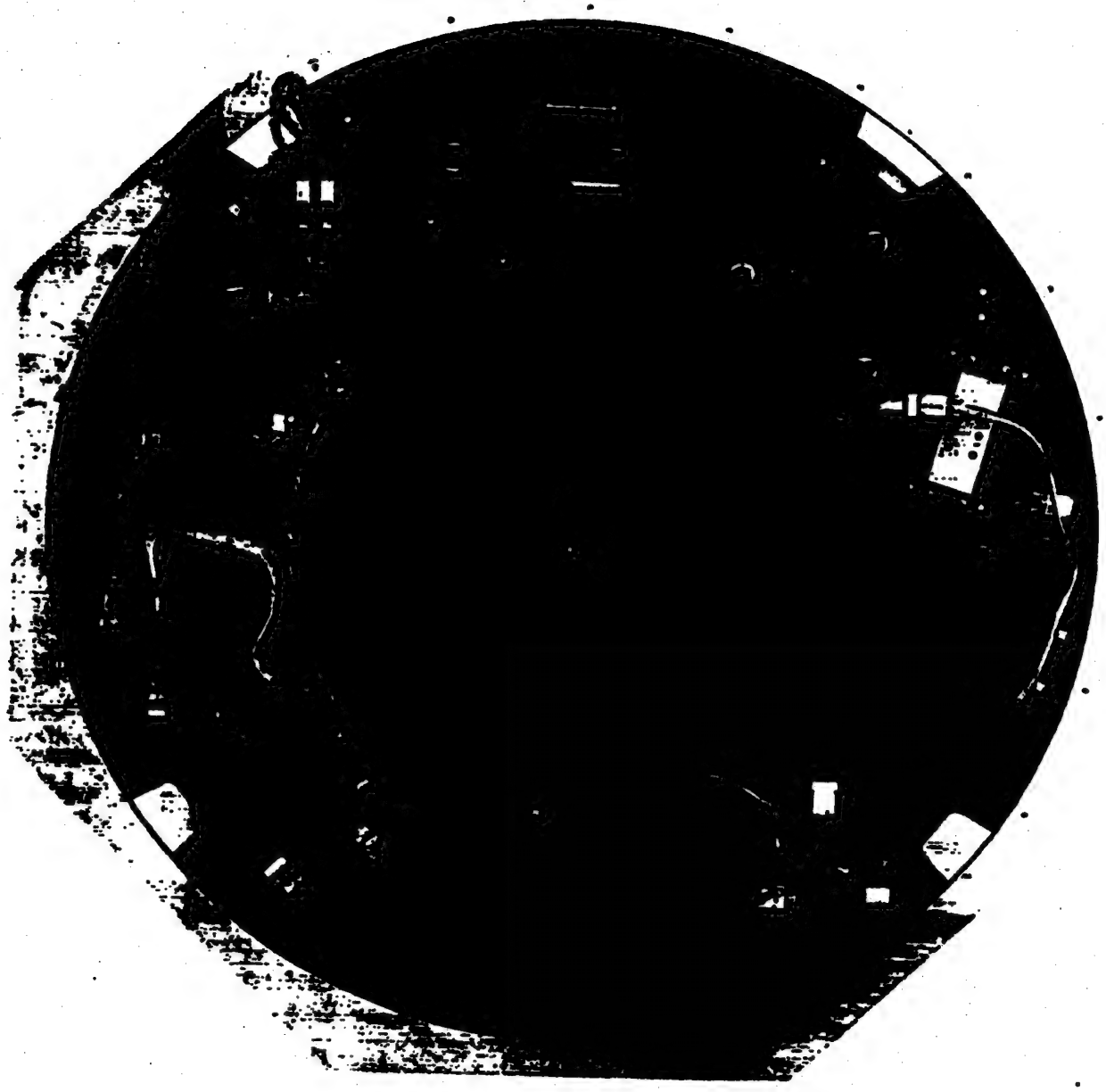
HIGH ACUITY
PANORAMIC CAMERA



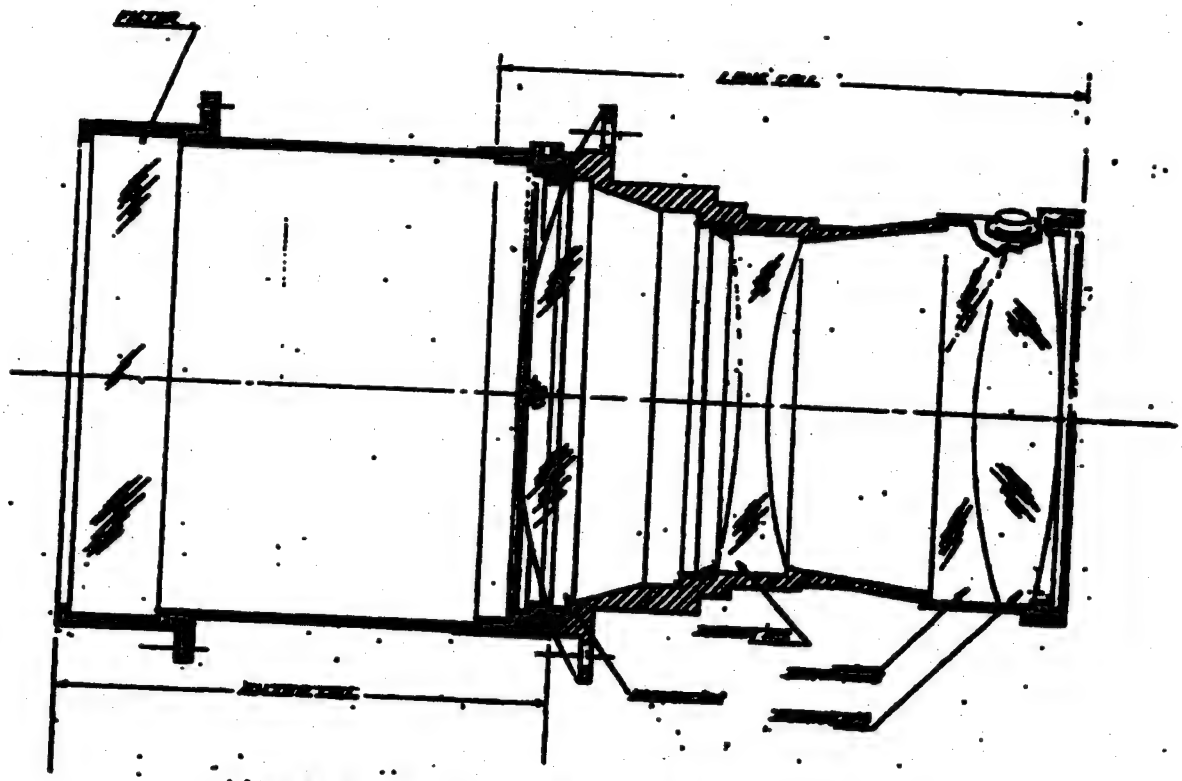
HIGH ACUITY
PANORAMIC CAMERA



HIGH ACUITY
PANORAMIC CAMERA



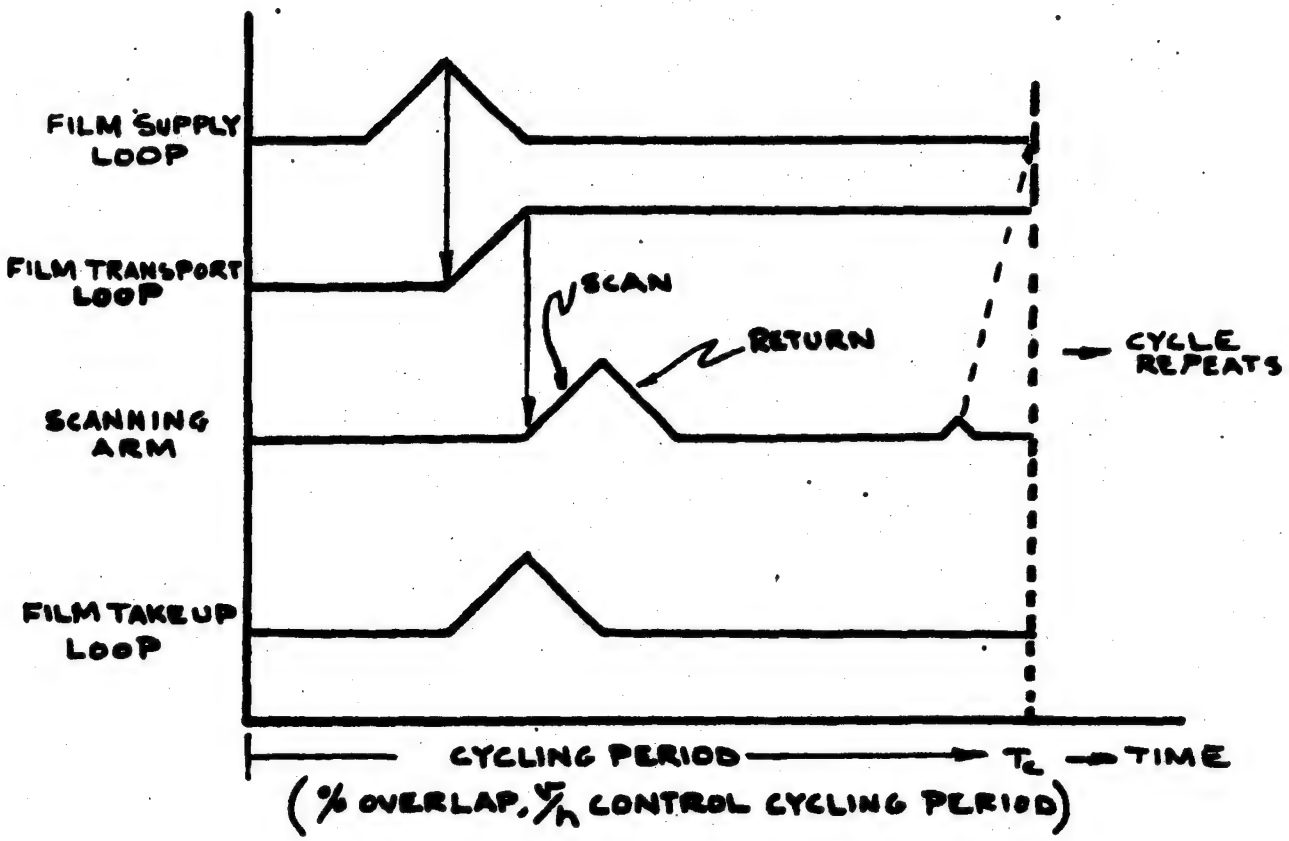
HIGH ACUITY



HYAC II LENS ASSEMBLY

FOCAL LENGTH 24" f/8

HYAC II
FUNCTIONAL DIAGRAM

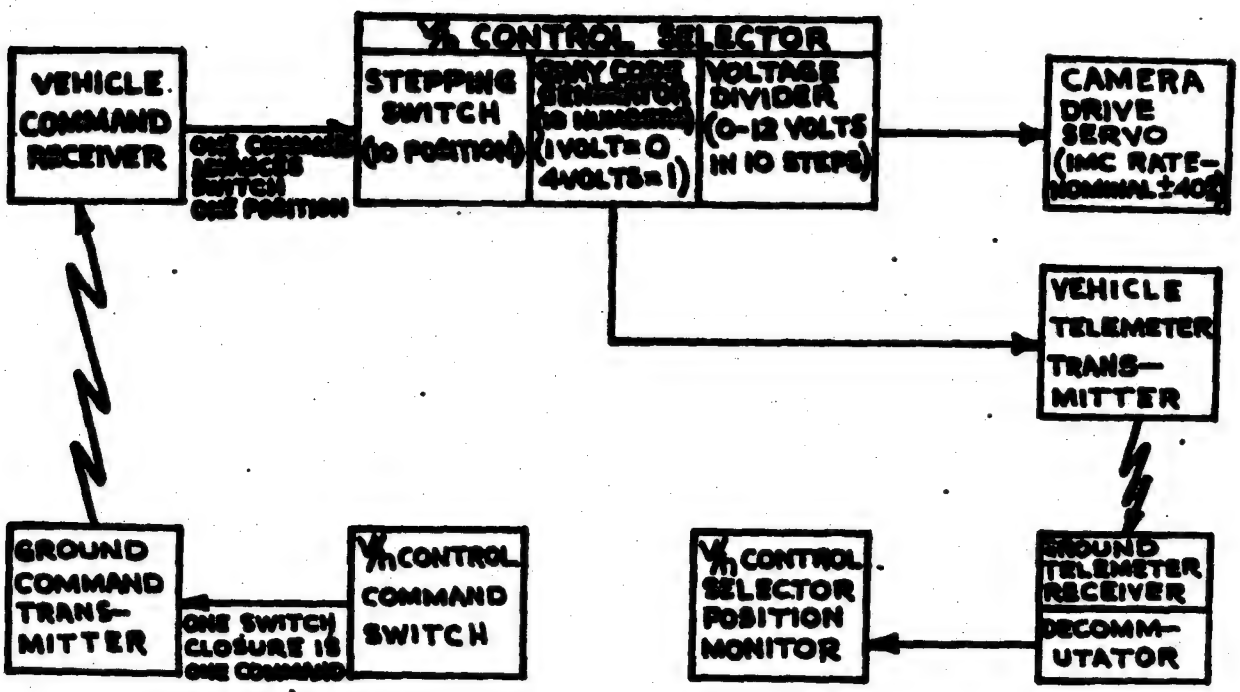


A. CONTROL — SEQUENTIAL

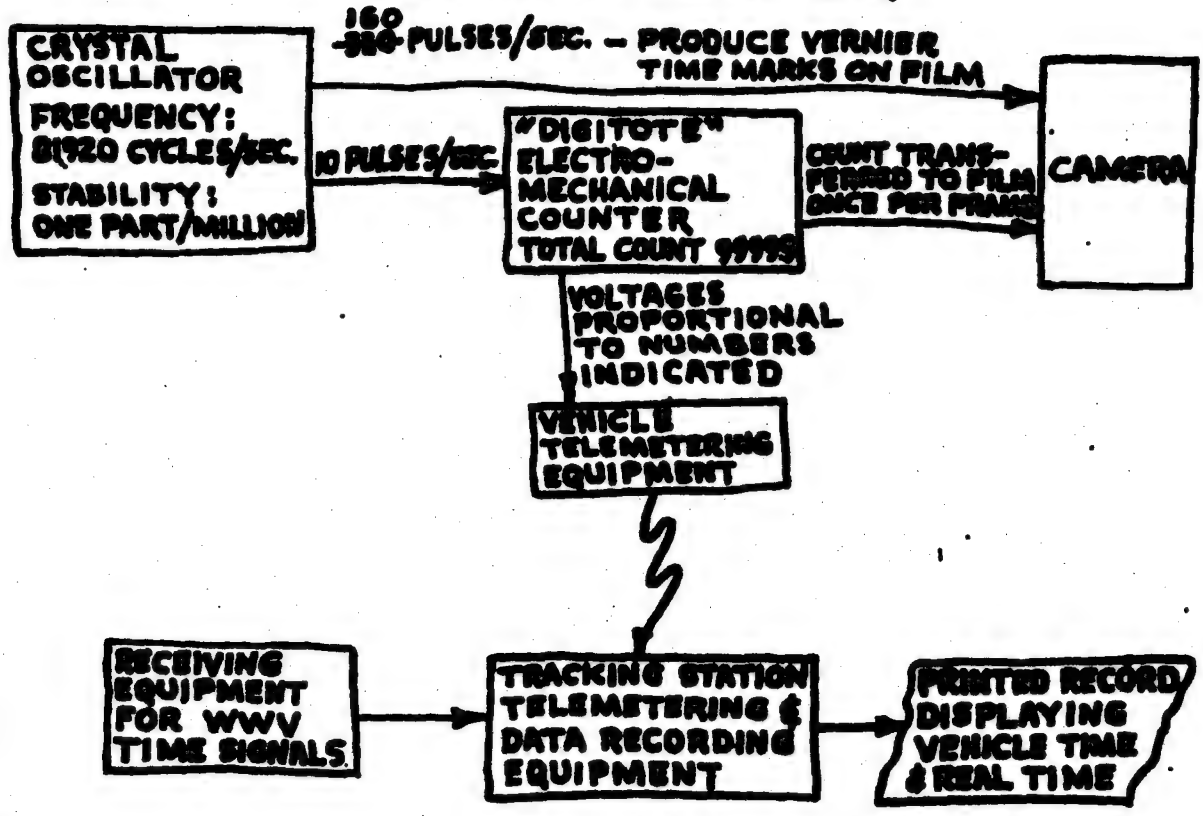
B. SEQUENTIAL STEPS

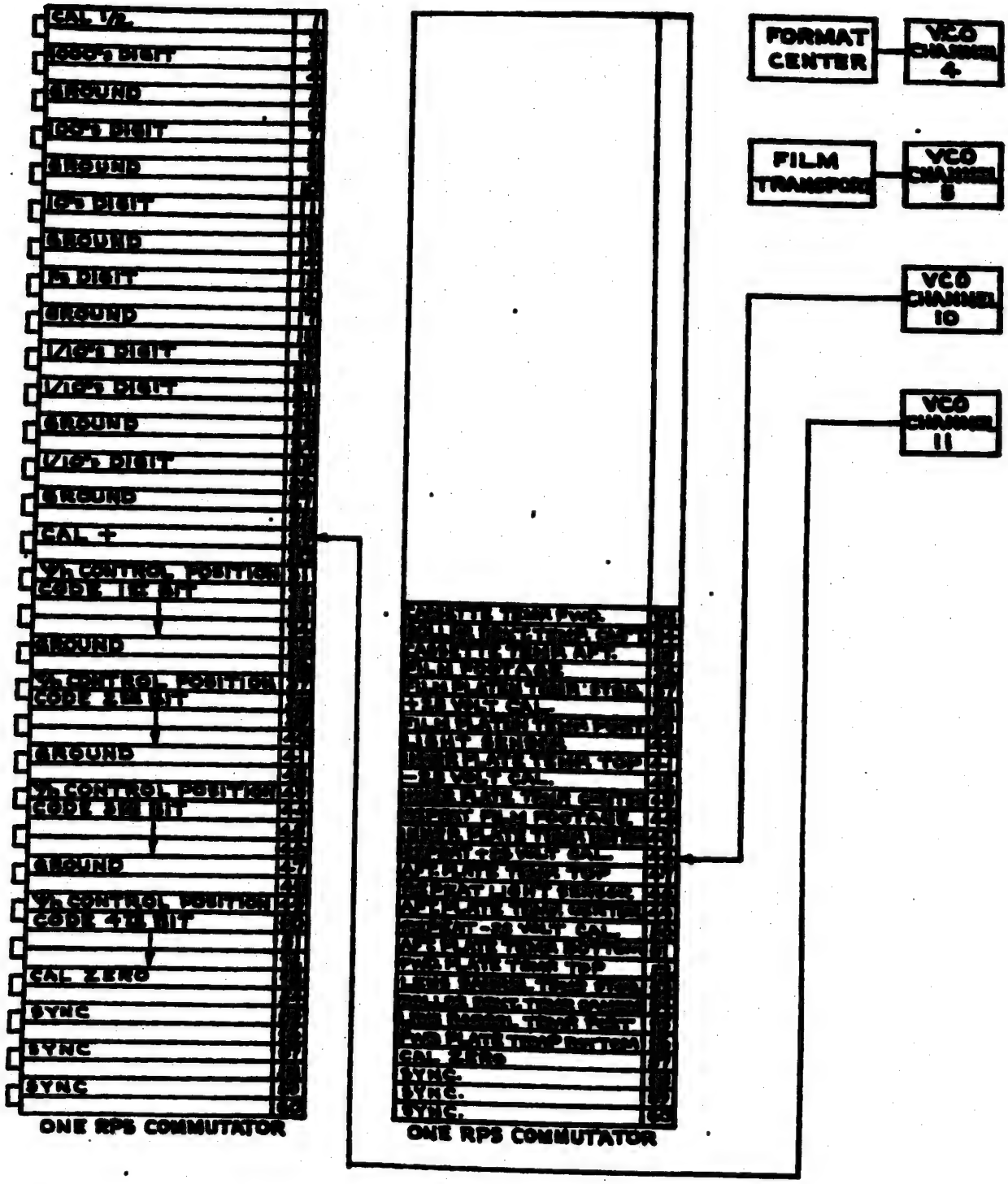
1. FILM SUPPLY LOOP FILLS.
2. FULL LOOP TRIGGERS FILM TRANSPORT.
3. FILM TRANSPORT COMPLETION TRIGGERS SCAN ARM.
4. SCANNING ARM RETURN STROKE PREPARES SYSTEM FOR REPETITIVE CYCLE.

V/h CONTROL


V/h CONTROL SELECTOR
VEHICLE COMMAND RECEIVER
STEPPING SWITCH (10 POSITION)
BINARY CODE GENERATOR (10 NUMBERS) (1 VOLT = 0 4 VOLTS = 1)
VOLTAGE DIVIDER (0-12 VOLTS IN 10 STEPS)
CAMERA DRIVE SERVO (IMC RATE-NOMINAL ±40%)
VEHICLE TELEMETER TRANS-MITTER
GROUND COMMAND TRANS-MITTER
ONE SWITCH CLOSURE IS ONE COMMAND
V/h CONTROL COMMAND SWITCH
V/h CONTROL SELECTOR POSITION MONITOR
GROUND TELEMETER RECEIVER
DECOMM-UTATOR

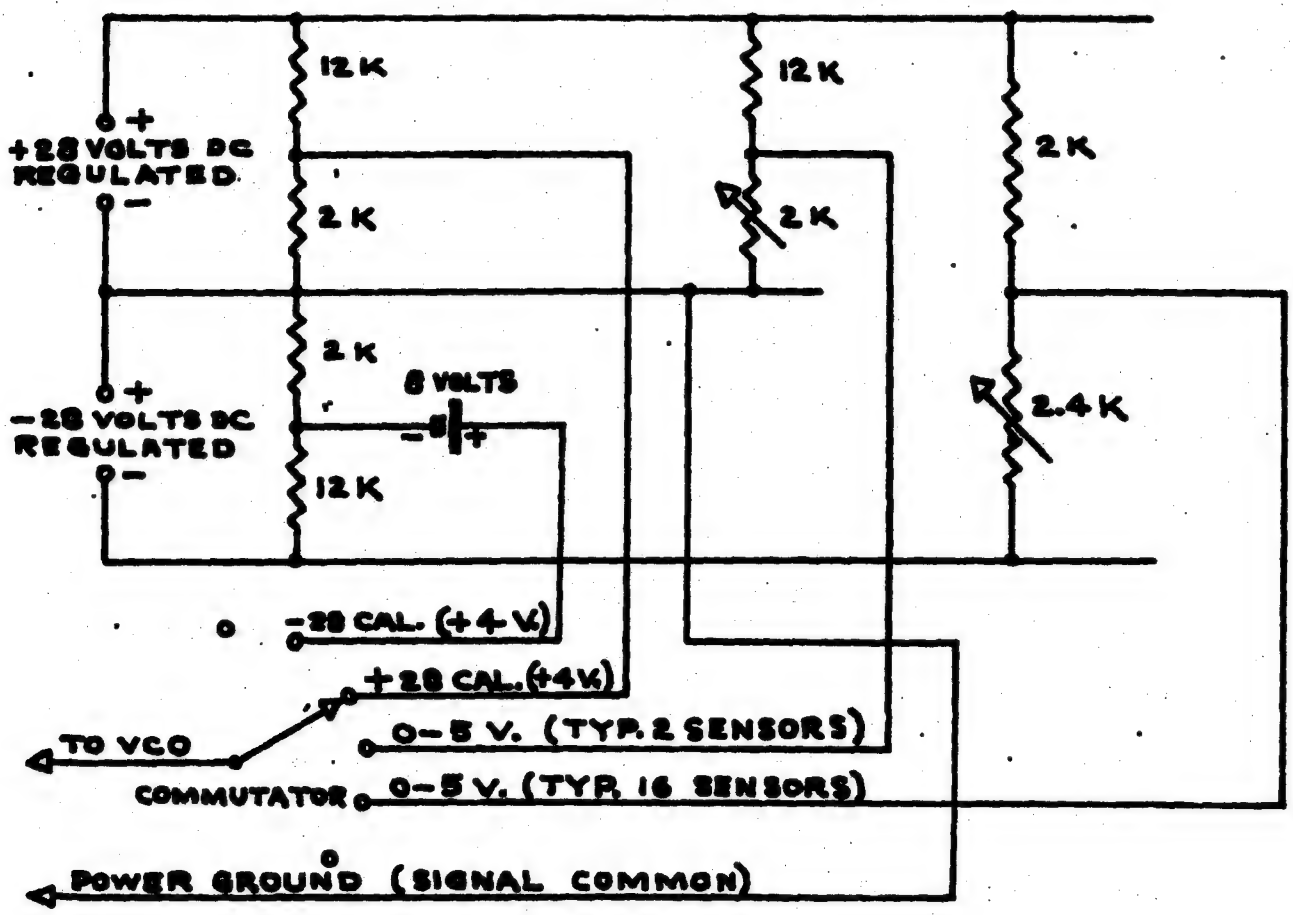
VEHICLE CLOCK


CRYSTAL OSCILLATOR
FREQUENCY: 81920 CYCLES/SEC.
STABILITY: ONE PART/MILLION
160 PULSES/SEC. – PRODUCE VERNIER TIME MARKS ON FILM
10 PULSES/SEC.
"DIGITOTE" ELECTRO-MECHANICAL COUNTER TOTAL COUNT 9999
COUNT TRANSFERRED TO FILM ONCE PER FRAME
CAMERA
VOLTAGES PROPORTIONAL TO NUMBERS INDICATED
VEHICLE TELEMETERING EQUIPMENT
RECEIVING EQUIPMENT FOR WWV TIME SIGNALS
TRACKING STATION TELEMETERING & DATA RECORDING EQUIPMENT
PRINTED RECORD DISPLAYING VEHICLE TIME & REAL TIME



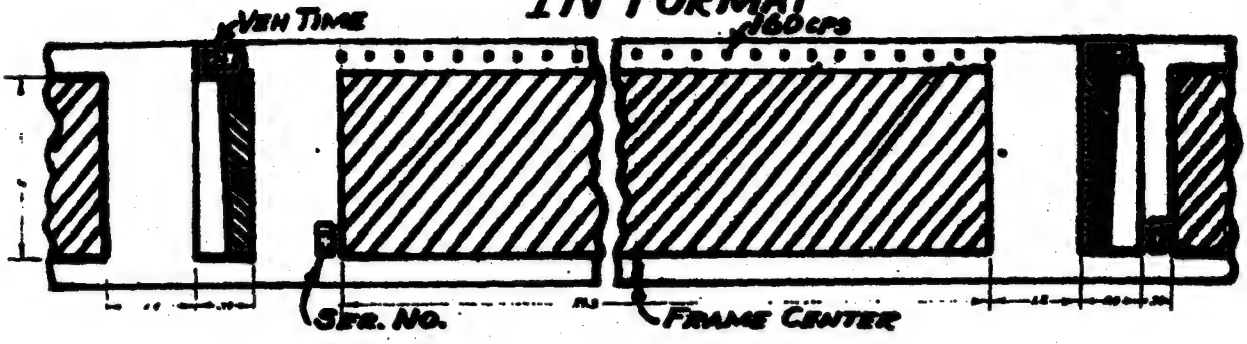
FLOW DIAGRAM
INSTRUMENTATION SIGNALS

SCHEMATIC CIRCUIT
COMMUTATED SIGNALS CH. 10

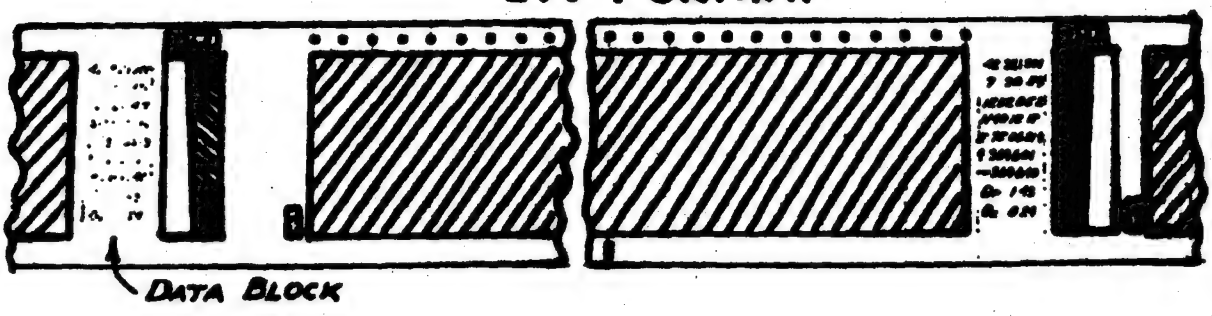


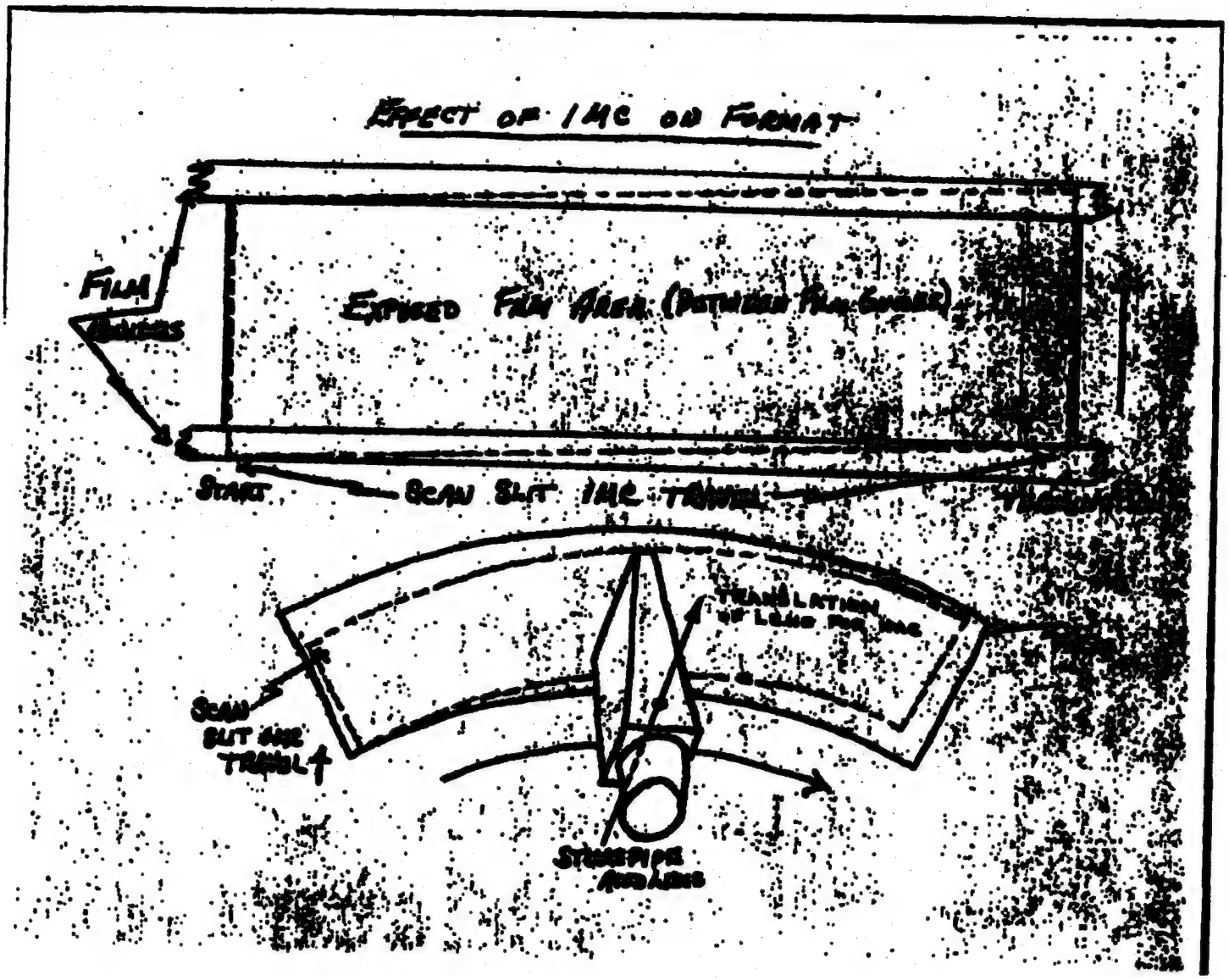
PRODUCT

1N FORMAT



1N' FORMAT




EFFECT OF IMC ON FORMAT
FILM
EXPOSED FILM AREA (POSITIVE FILM SHOWN)
START
SCAN SLIT IMC TRAVEL
TRANSLATION
SCAN SLIT IMC TRAVEL
STEREOPIPE

POWER CONSUMPTION
RECONNAISSANCE SYSTEM

POWER SOURCE	SEPT. 24 WATT-HOURS	JAN. 23 WATT-HOURS
115 VOLTS ± 1% 400 ± 1 CPS, 1 Φ	15	5
115 VOLTS ± 5% 2000 ± 20 CPS, 1 Φ	240	0
+28 VOLTS D.C. REGULATED ± 1.8%	1232.5	326
−28 VOLTS D.C. REGULATED ± 1.8%	12.5	20
+28 VOLTS D.C. UNREGULATED	0	190
TOTAL	1500	541

56A

Notice of Page Substitution

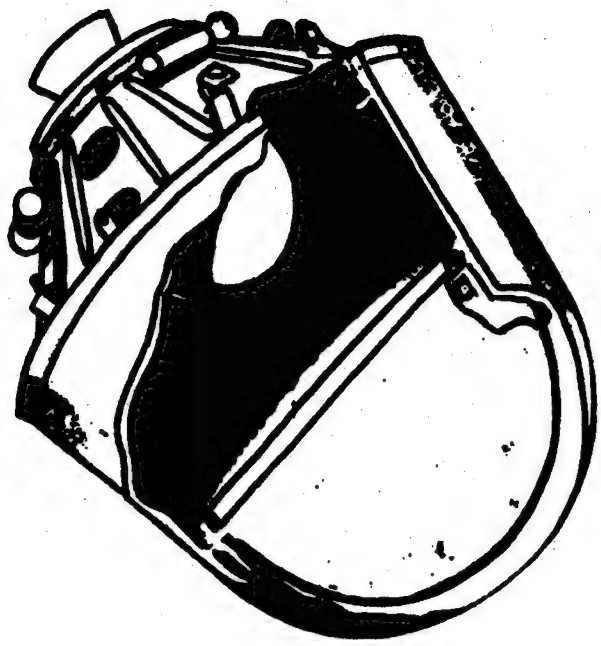
Recovery Body

For the purposes of electronic archiving, this page is a substitute for an unscannable page.

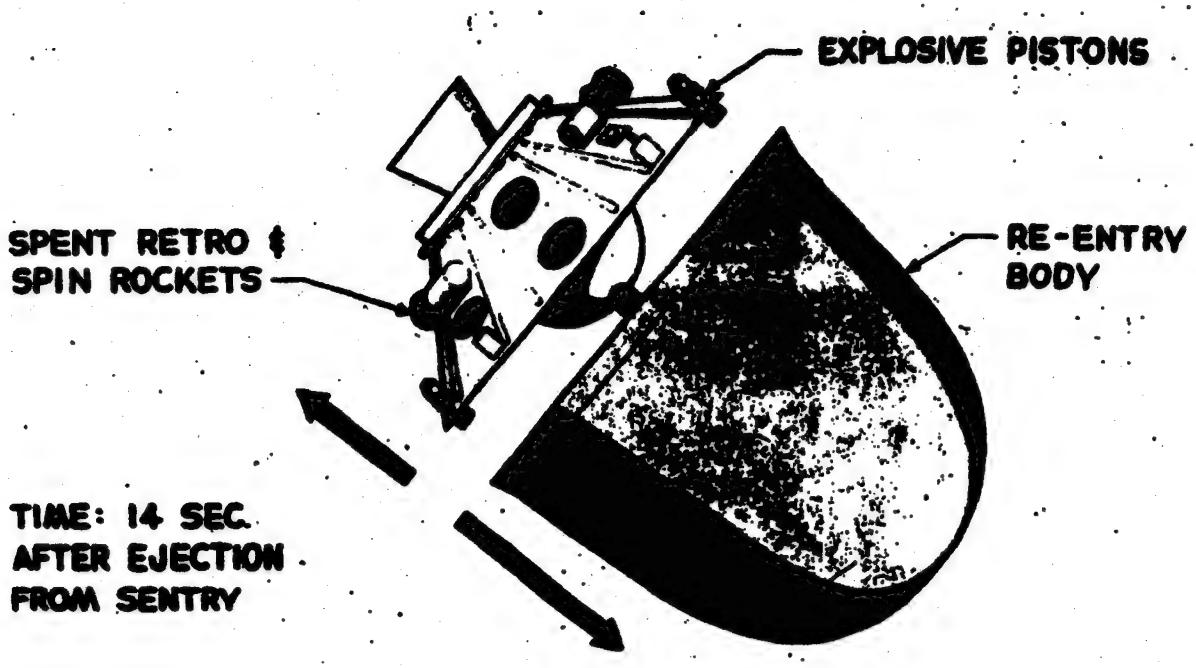
RECOVERY SYSTEM

- PARACHUTE DESCENT
- CAPSULE TRACKING & ACQUISITION AIDS
  - (A) CHAFF
  - (B) SILVERED CHUTE
  - (C) PULSED BEACON
  - (D) RESCUELITE
- DETECTION DEVICES
  - (A) RC-121 AIRCRAFT WITH APS20/45 RADAR
  - (B) C-119J AIRCRAFT WITH DIRECTION FINDER
  - (C) SHIPS WITH DIRECTION FINDER
- PICKUP EQUIPMENT
  - (A) C-119J WITH A.A.E. CO MODEL 80C PICKUP EQUIPMENT
  - (B) SHIP

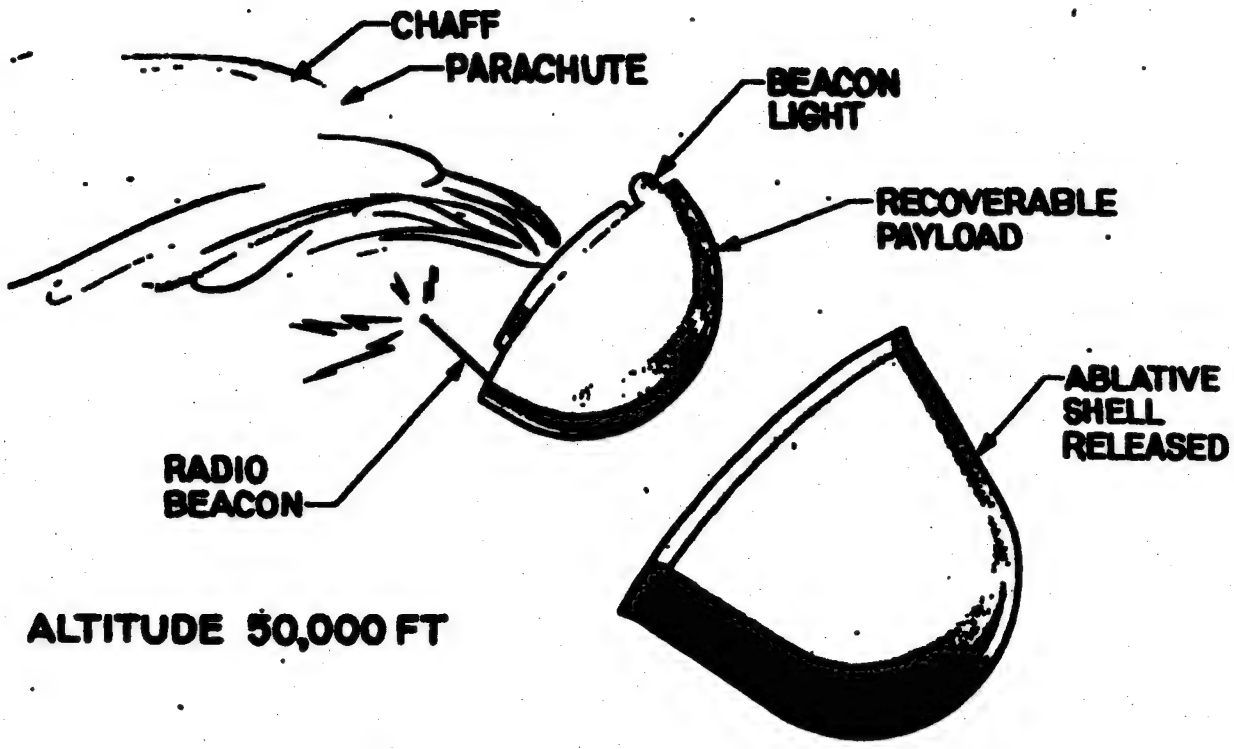
RE-ENTRY CAPSULE



PROPULSIVE SYSTEM RELEASE



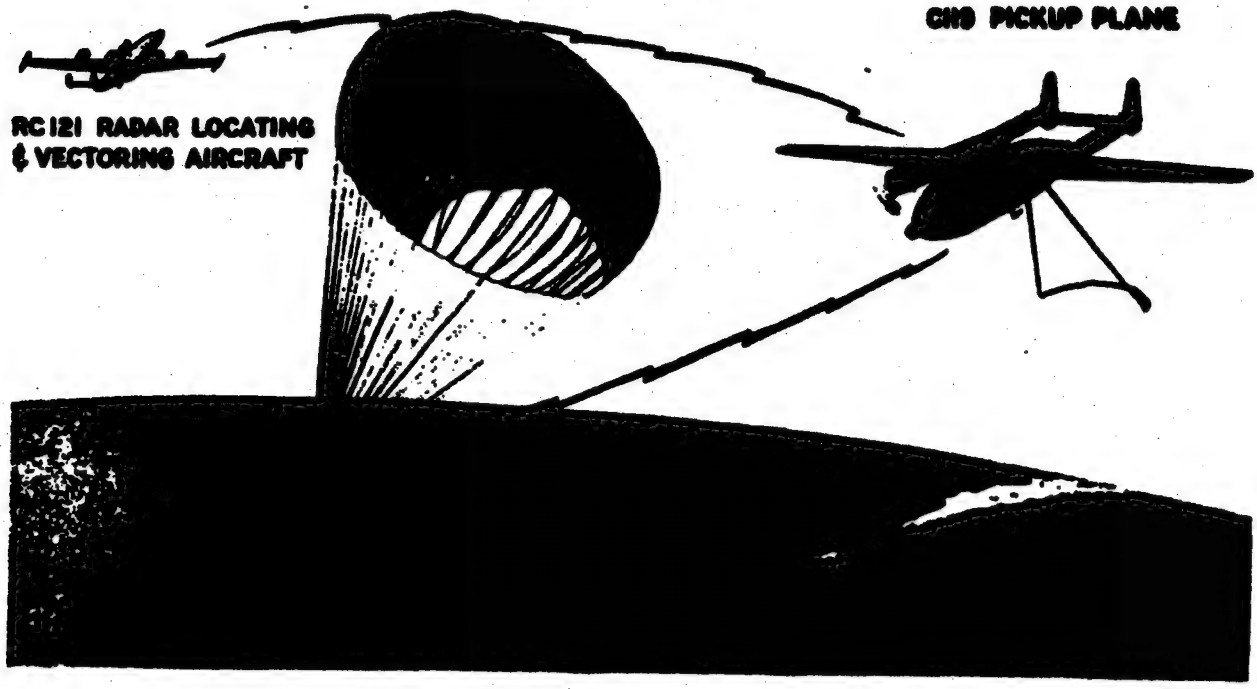
RECOVERY SYSTEM



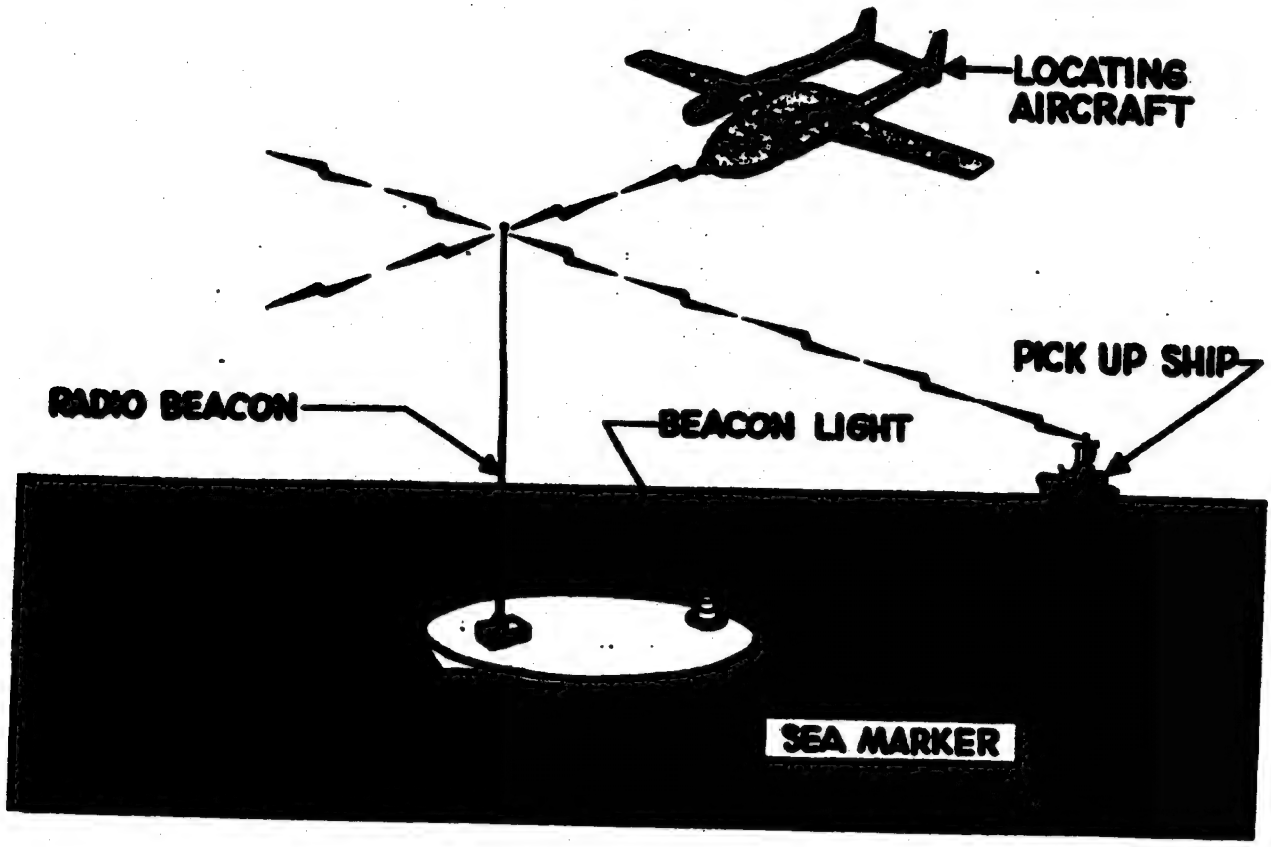
ALTITUDE 50,000 FT

CAPSULE RECOVERY

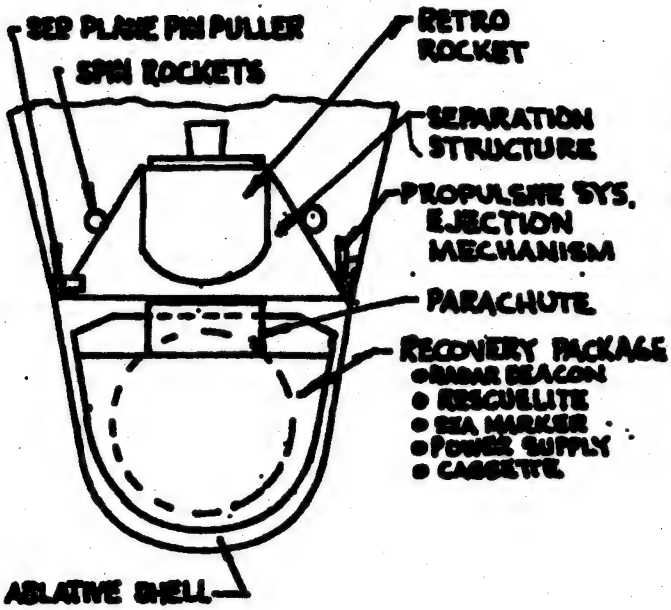
PROGRAM IIA



WATER RECOVERY



AET RECOVERY SYSTEM

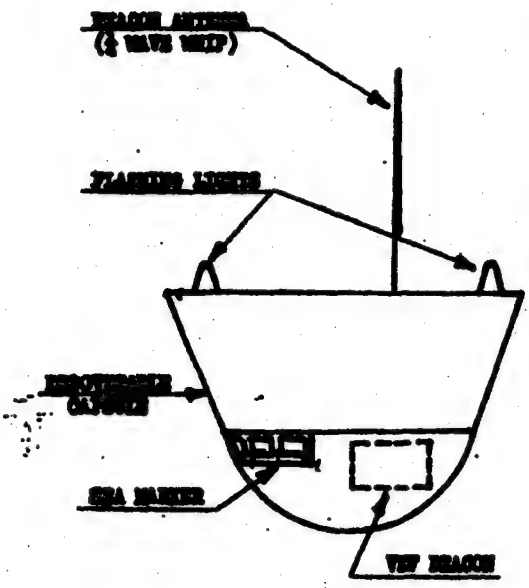


WEIGHTS

RECOVERY SHELL	84.5 LBS
PROPULSION EJECTION	73.5
RECOVERY SYSTEM	63.5
CASSETTE	12.5 (CAPACITY- 40 LBS)
TOTAL	234.0 LBS

NOTE: FILM NOT INCLUDED

RECOVERY AIDS CHARACTERISTICS



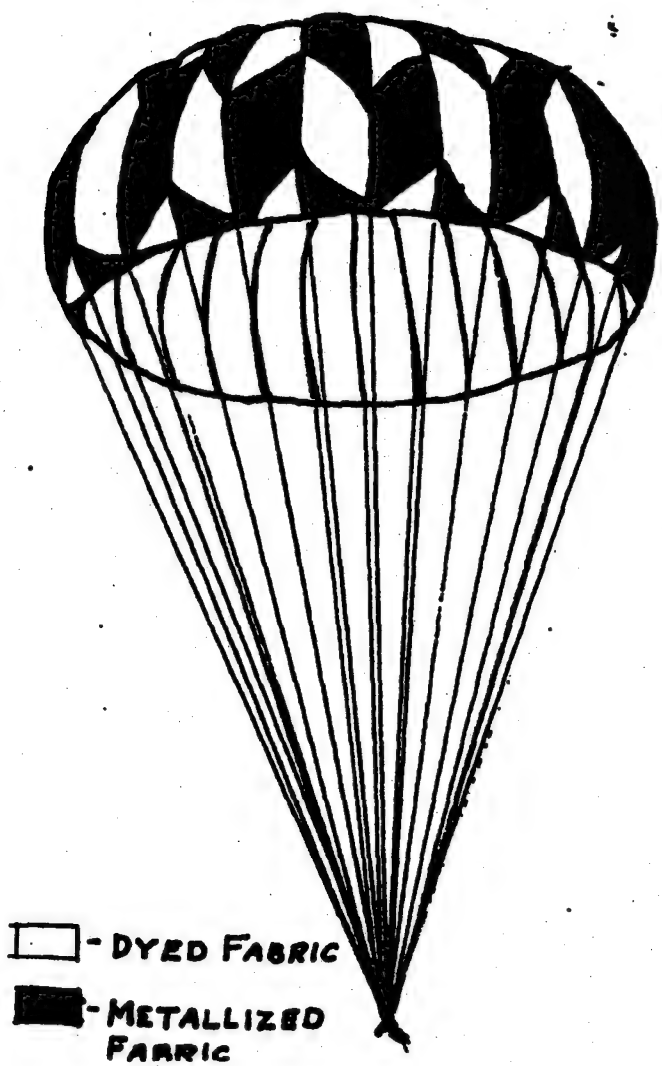
VHF BEACON
(1) OPERATING FREQUENCY - 238.4 MC
(2) PULSE REPETITION FREQUENCY - 1.0 CPS
(3) PEAK POWER OUTPUT - 15 WATTS
(4) AVERAGE POWER OUTPUT - 60 MILLIWATTS
(5) WEIGHT - 4 LBS.
(6) OPERATING CAPABILITY - 18 HOURS

FLASHING LIGHT (2 REQUIRED)
(1) TYPE - XENON FLASH LAMP
(2) INTENSITY - 2 x 10^6 LUMEN PEAK PER FLASH
(3) FLASH REPETITION INTERVAL - 1 SECOND
(4) WEIGHT - 6 OUNCES EACH
(5) OPERATING CAPABILITY - 18 HOURS

SEA MARKER (2 REQUIRED)
(1) TYPE - AIRBORNE FLARE
(2) OPERATION - RELEASED THROUGH WATER-SOLUBLE FILM
(3) SIZE OF SLICK - APPROXIMATELY 30 FEET WIDE,
VERY DEPENDENT ON SEA STATE
(4) DURATION OF MARKER - 12 HOURS MAXIMUM

MAXIMUM DETECTION RANGE
(1) BEACON - 100 N. MILES TO AIRCRAFT, 60 N. MILES TO SHIP,
BOTH USING RMD-GLASER AN/APN-2 RECEIVING
EQUIPMENT
(2) FLASHING LIGHT - 12 N. MILES TO AIRCRAFT, 3 N. MILES TO
SHIP RADAR; LARGELY DEPENDENT ON SEA STATE AND
TIME OF DAY OR NIGHT
(3) SEA MARKER - LESS THAN ONE MILE, AIR OR WATER RECEIVER;
LARGELY DEPENDENT ON WEATHER AND SEA STATE

PARACHUTE & CHAFF SYST.



PARACHUTE CHARACTERISTICS:

(1) DIAMETER - 83.5 FEET
(2) WEIGHT - 16.5 LBS.
(3) SINK RATE - 25 FPS AT 10,000 FT
(4) CANOPY -
1.1 OZ/SQ. YD. NYLON REINFORCED
15% FLAT EXTENDED SKIRT
CHECKERED WITH ALTERNATE SECTIONS OF METALIZED AND PURE CHARGE FABRIC FOR - BOTH RADAR REFLECTIVITY AND VISUAL RECOGNITION
(5) SHROUDS - ALTERNATELY 375 & 1500 LB. TEST

CHAFF CHARACTERISTICS:

(1) RELEASED WITH GUPPY OPERATION
(2) TYPE D, REVERE COPPER & BRASS CO.
(3) .008" WIDE X .0005" thick aluminum
(4) WEIGHT OF PACKAGE - .8 lb
(5) TUNED TO "X" AND "S" BANDS

MAXIMUM DETECTION RANGES:

(1) PARACHUTE, VISUAL - APPROX. 5M. MILES
(2) PARACHUTE, APS-20 RADAR - 70 N. MILES
(3) PARACHUTE, APS-45 RADAR- 70 N. MILES
(4) CHAFF, APS-20 RADAR - 160 N. MILES

Notice of Page Substitution

Programmer

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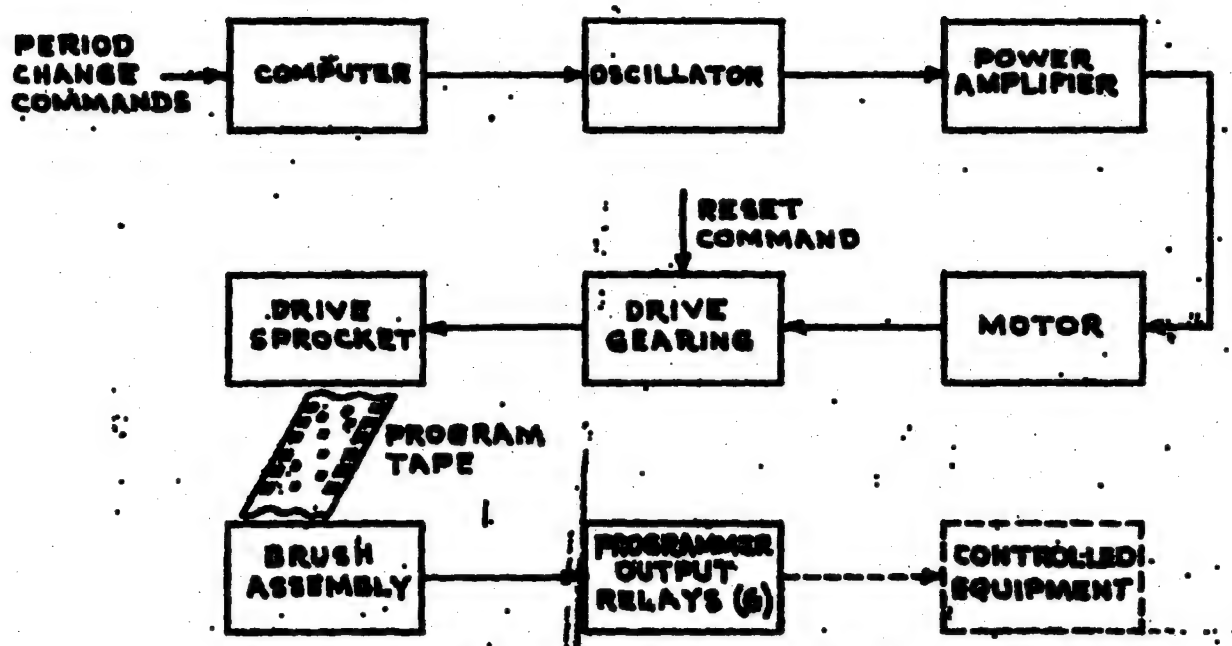
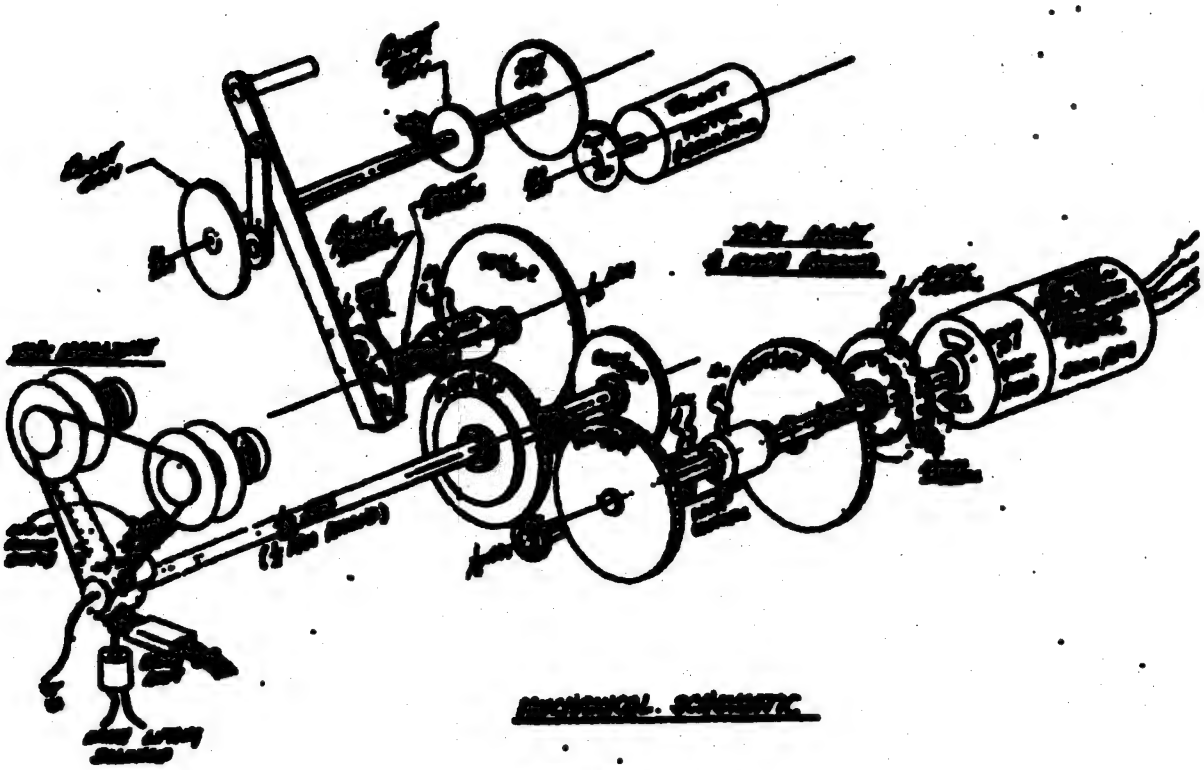


SIMPLIFIED FUNCTIONAL BLOCK DIAGRAM
SECONDARY PROGRAMMER

Programmer period is adjustable by command to be equal to the vehicle orbit period to ± 5 seconds

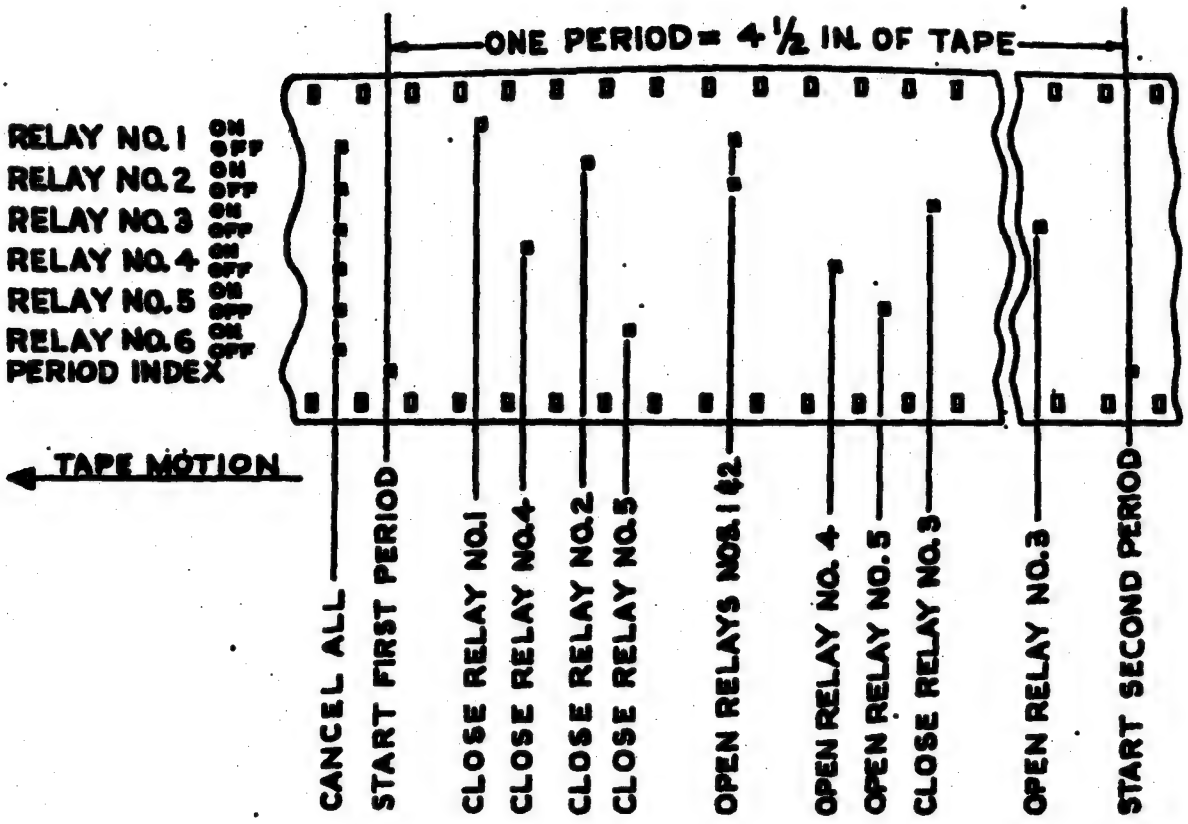
Programmer may be reset by command to synchronize programmed events with position of vehicle in orbit

Capacity – 120 orbit programs, all different.

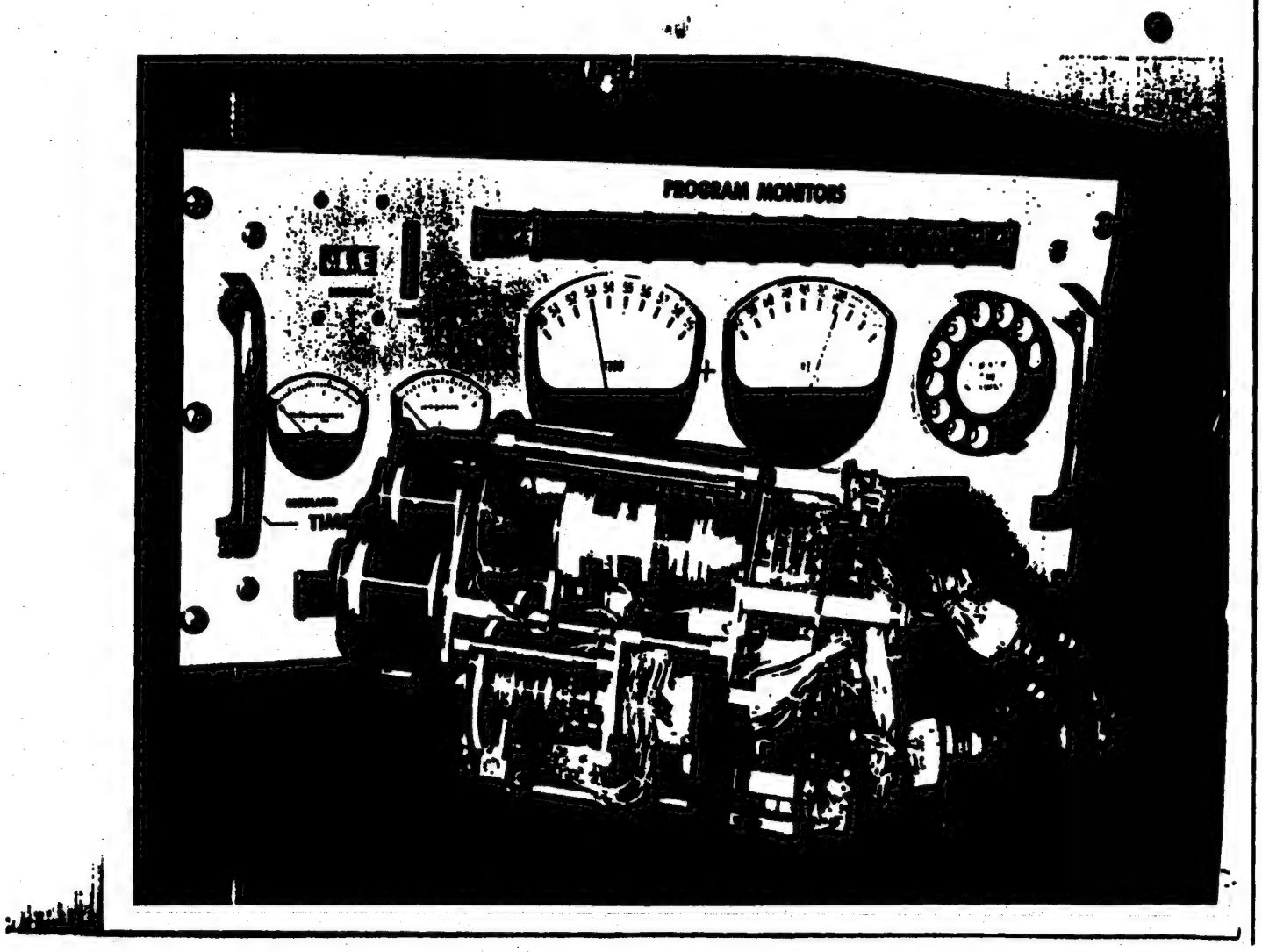


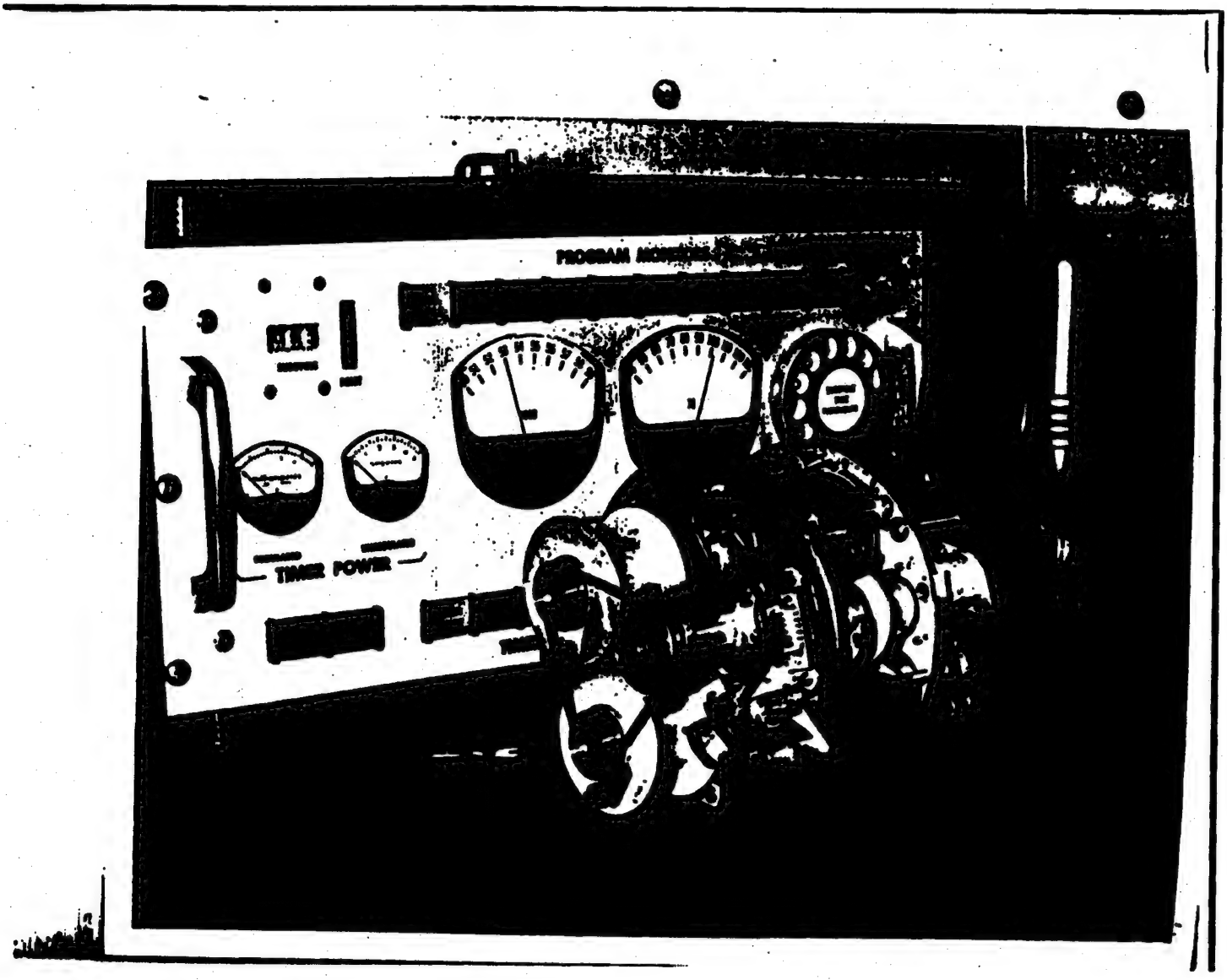
MECHANICAL SCHEMATIC

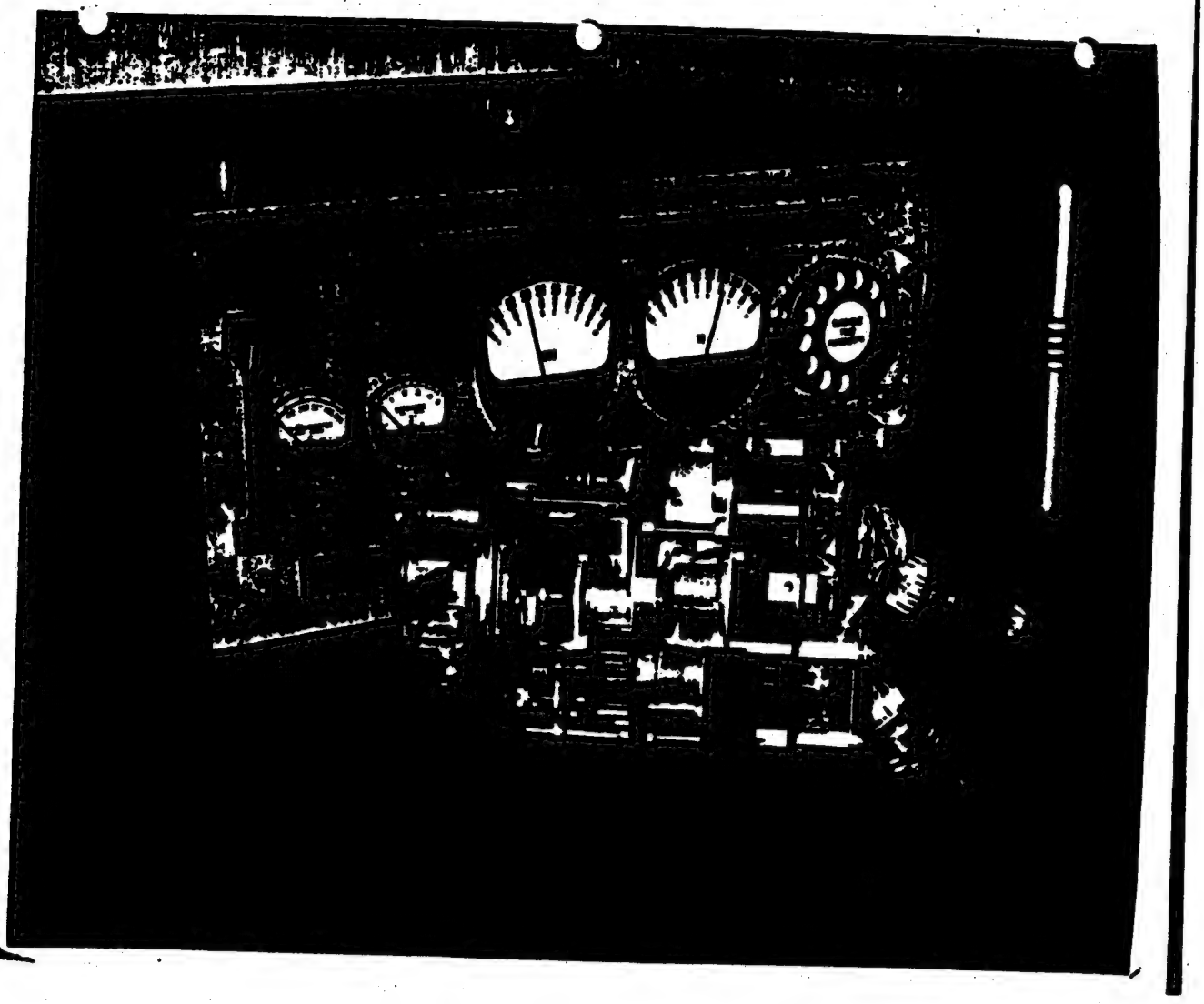
SCHEMATIC DIAGRAM

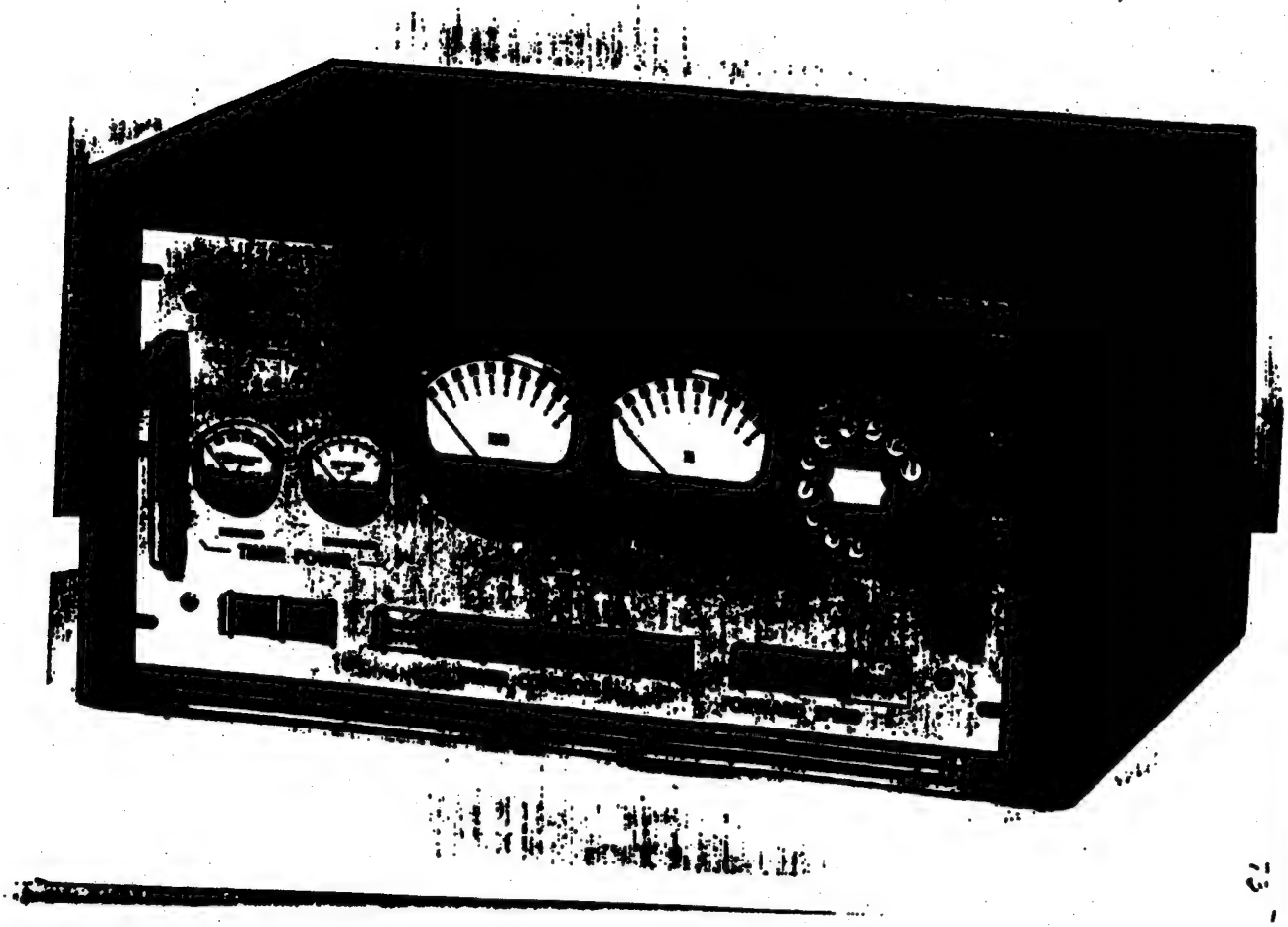

ONE PERIOD = 4 1/2 IN. OF TAPE
RELAY NO. 1 ON OFF
RELAY NO. 2 ON OFF
RELAY NO. 3 ON OFF
RELAY NO. 4 ON OFF
RELAY NO. 5 ON OFF
RELAY NO. 6 ON OFF
PERIOD INDEX
TAPE MOTION
CANCEL ALL
START FIRST PERIOD
CLOSE RELAY NO.1
CLOSE RELAY NO.4
CLOSE RELAY NO.2
CLOSE RELAY NO.5
OPEN RELAYS NOS. 1 & 2
OPEN RELAY NO. 4
OPEN RELAY NO. 5
CLOSE RELAY NO. 3
OPEN RELAY NO. 3
START SECOND PERIOD

TYPICAL TAPE
SECONDARY PROGRAMMER


PROGRAM MONITORS


TIMER POWER





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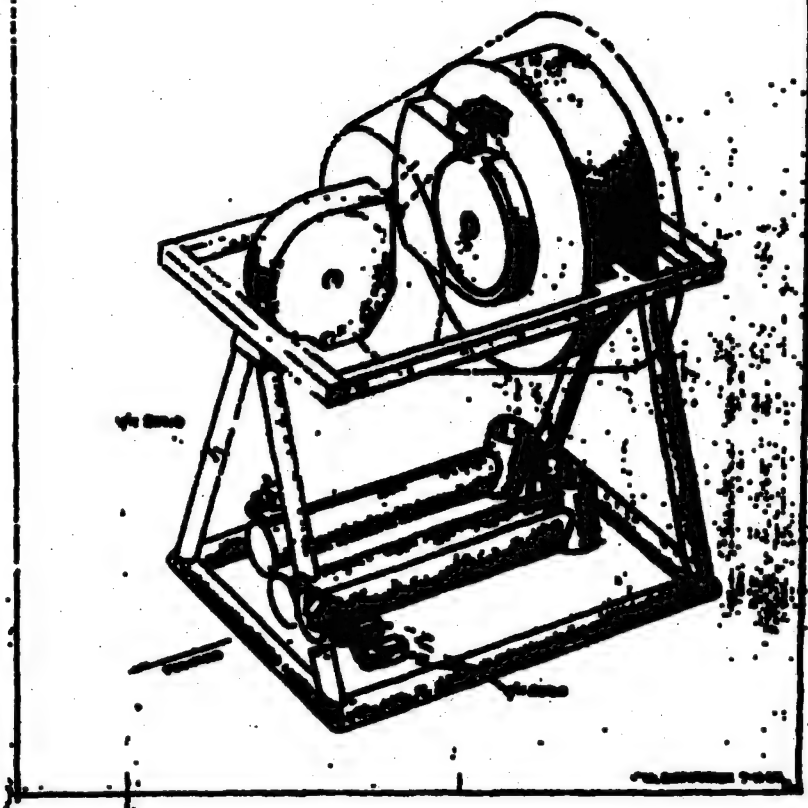
SIMULATOR



7

Notice of Page Substitution

Test Program

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ALTITUDE TEST CHAMBER

TEMP. SYSTEM

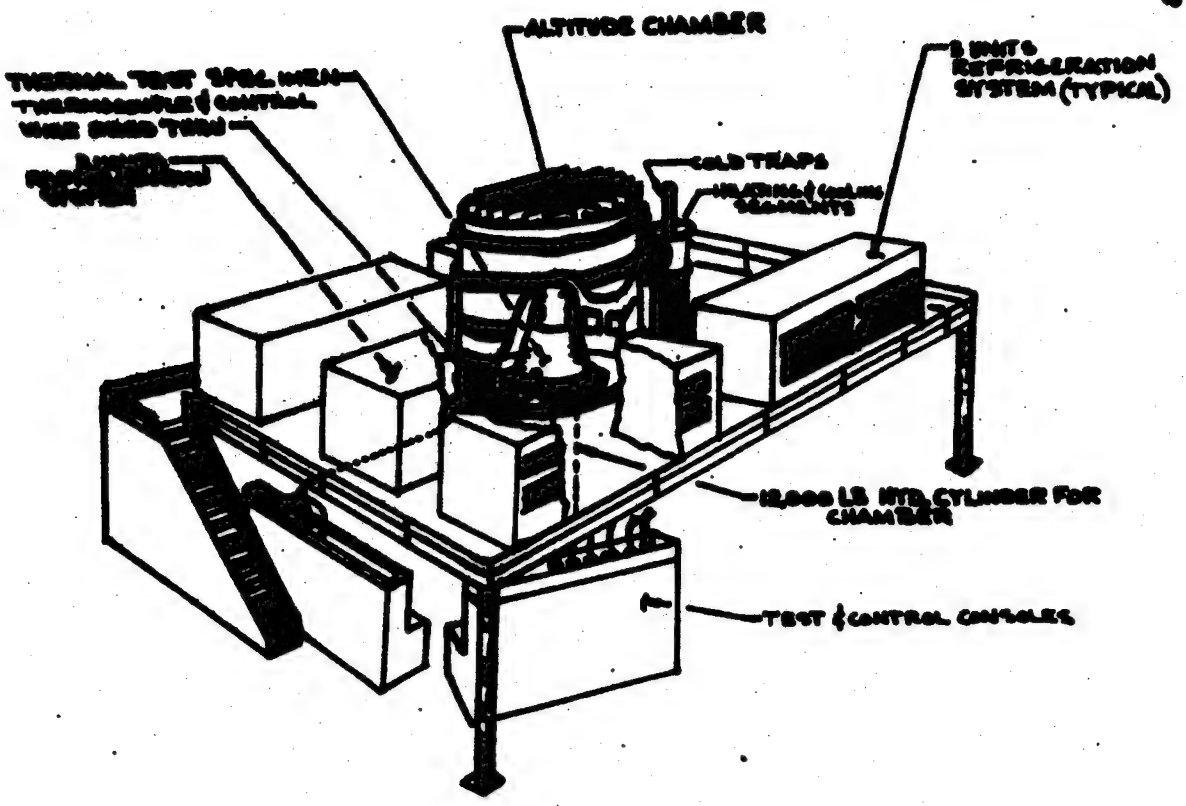
SIDE SEGMENTS (12) $-65°C$ to $+160°C$
TOP & BOTTOM PLATES $-50°C$ to $+100°C$
SEG. TEMP. PROGRAMMED - AUTO OR MANUAL

VACUUM SYSTEM

ULTIMATE VACUUM 1×10^{-6} mm Hg.
SPECIFIED PRESS. REACHED & MAINTAINED
IN MAX. OF 60 MIN. W/ DRY CHAMBER

INSTRUMENTATION

VACUUM MONITORING - CONT. RECORD & VISUAL
" MEASURING SYST. 800 mm Hg to 10^{-7} mm Hg
$\pm 5\%$ ACTUAL READING
TEMP. MEASUR. INPUTS TO RAD ELEM - 14 RECORDERS
" " TEST SPECIMEN - 4 RECORDERS
(20 DATA CH. EA)



ENVIRONMENT TEST CHAMBER INSTAL.

THERMAL TEST #1 OBJECTIVES

A. CALIBRATION TEST

1. DETERMINE TEMP. CHANGE CAPABILITY OF CHAMBER W/ SMALL LOAD
2. ESTIMATE RESPONSE OF VEHICLE SKIN ALONE TO ENVIR. CONDITIONS

B. AET TEST

TO CHECK CERTAIN POINTS IN ORDER TO ESTABLISH DESIGN CRITERIA.

1. DETERMINE MEAN TEMP. OF INTERIOR UNDER ASSUMED ENVIRON. CONDITIONS.
2. DETERMINE MAGNITUDE OF OSCILLATIONS OF THE INTERIOR TEMPERATURE.
3. DETERMINE CHARACTERISTIC TIME OF THE MEAN INTERNAL TEMP. CHANGES.
4. DETERMINE INFLUENCE OF THERMAL OSCILLATIONS ON THE CHARACTERISTIC TIME OF MEAN INTERNAL TEMP. CHANGES.

THERMAL TEST #1 RESULTS

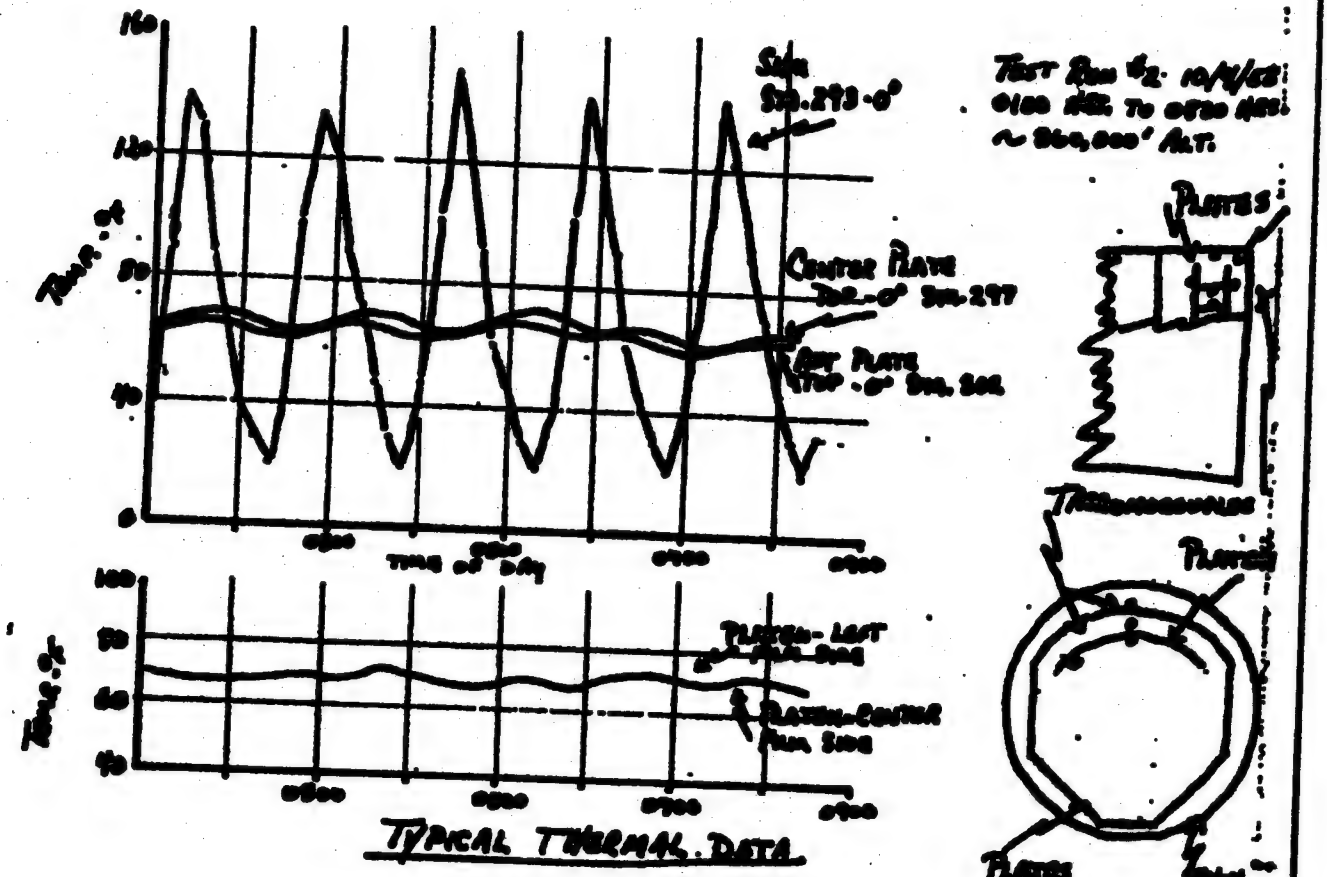
1. SPATIAL-TEMPORAL TEMPERATURES DISTRIBUTIONS WERE OBTAINED.

2. TEMPERATURE DIFFERENCES ON PLATE 3 DO NOT EXCEED APPROX. 8°F. AT ANY TIME.

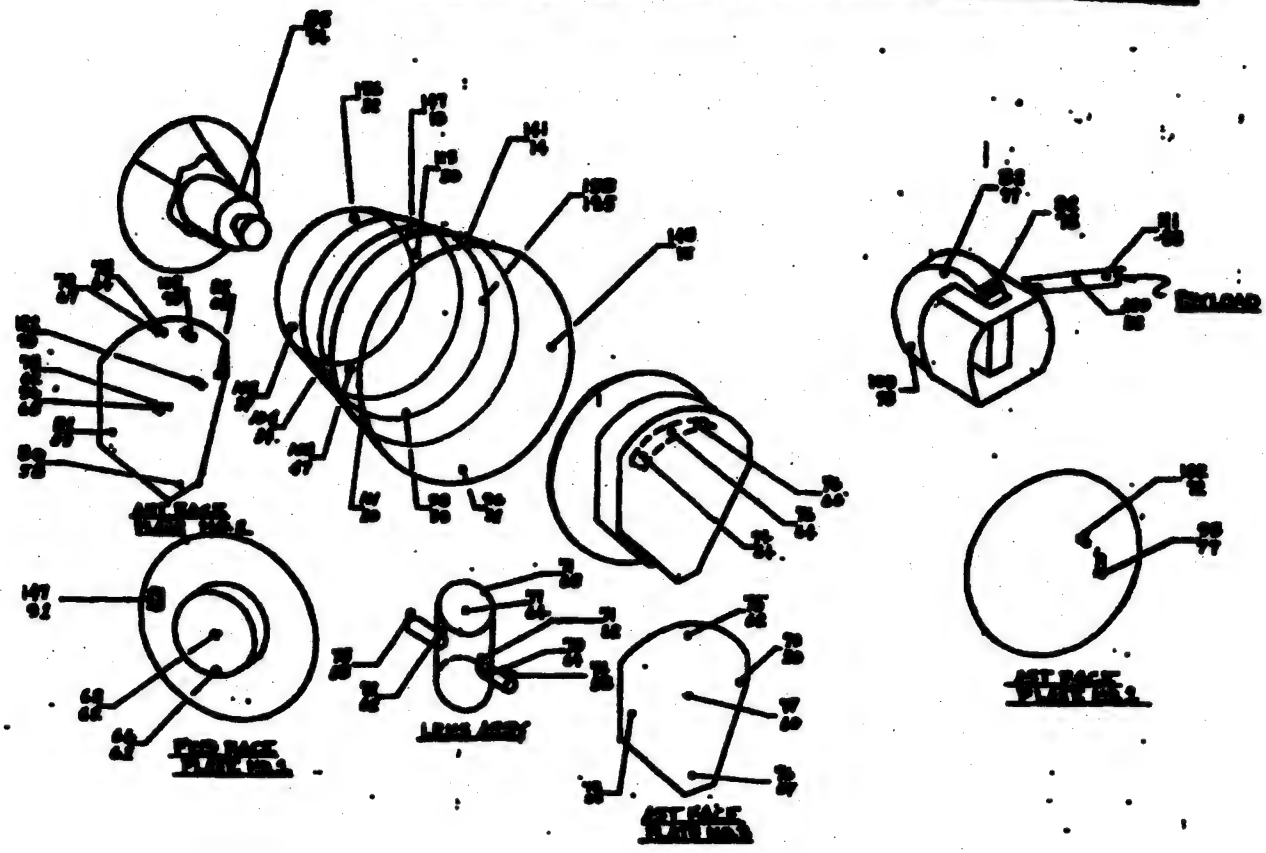
3. TEMPERATURE ON PLATE 2 INDICATE NEED FOR MORE EFFECTIVE ISOLATION FROM HEAT SOURCES.

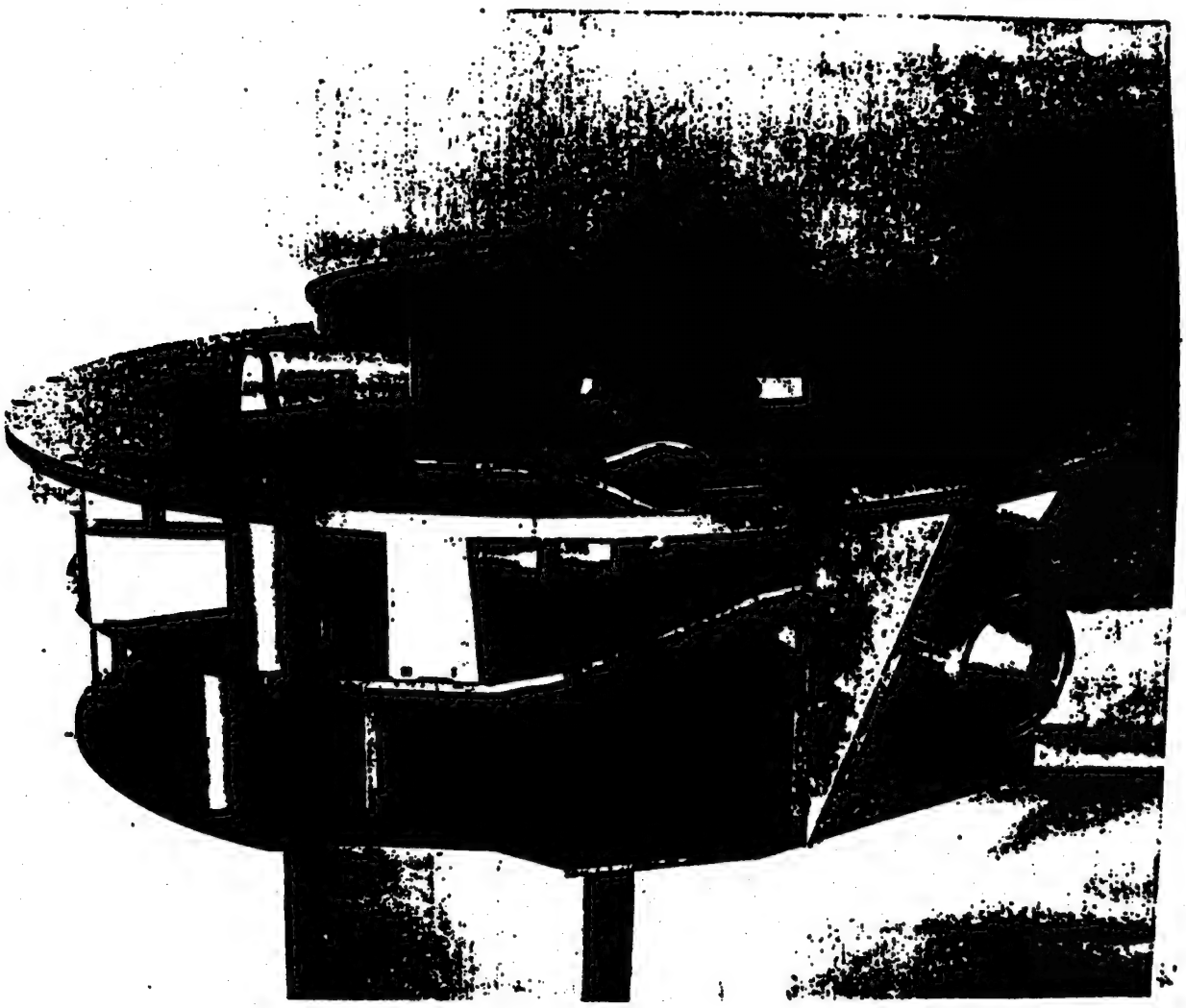
4. THERMAL DESIGN OF ELECTRONICS SECTION SHOULD AIM AT MEAN TEMPERATURE OF + 75°F.

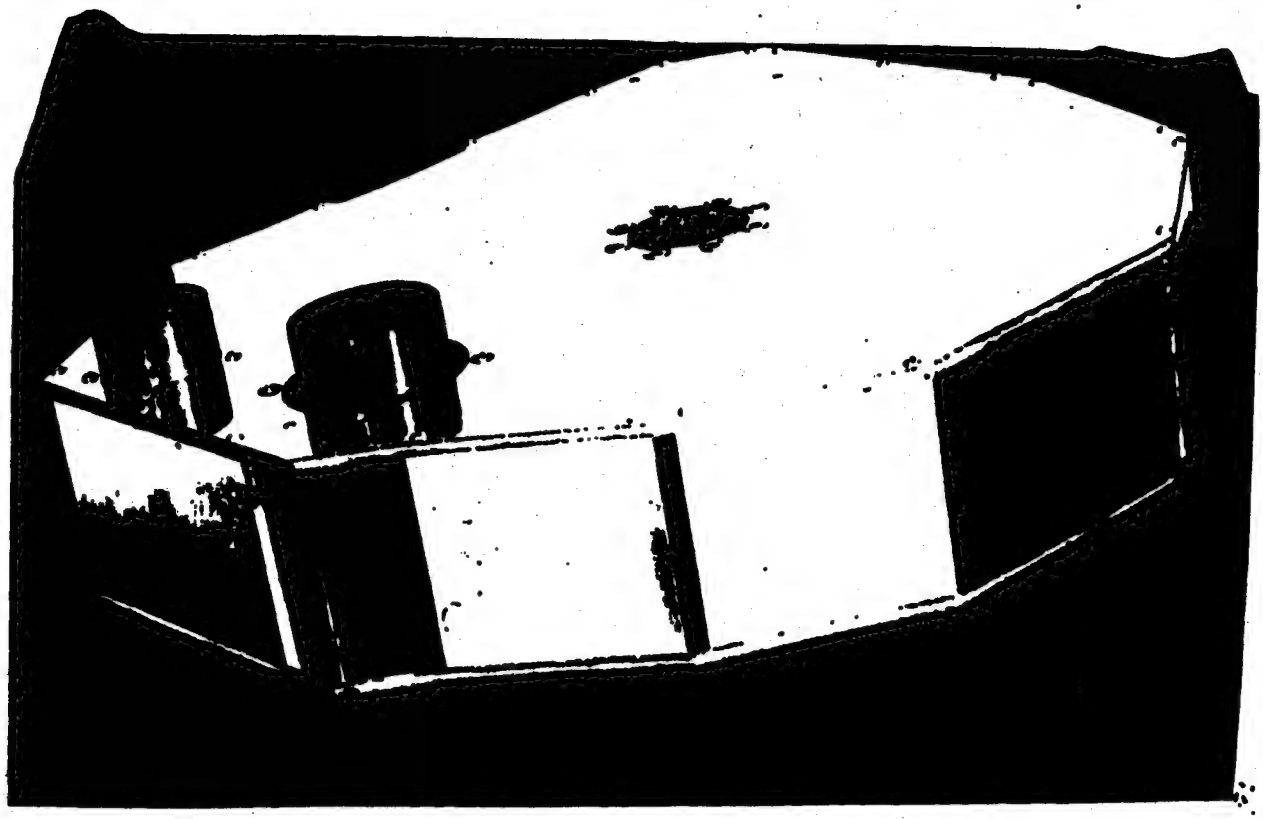
5. BASIC THERMAL CONTROL DESIGN VERIFIED.

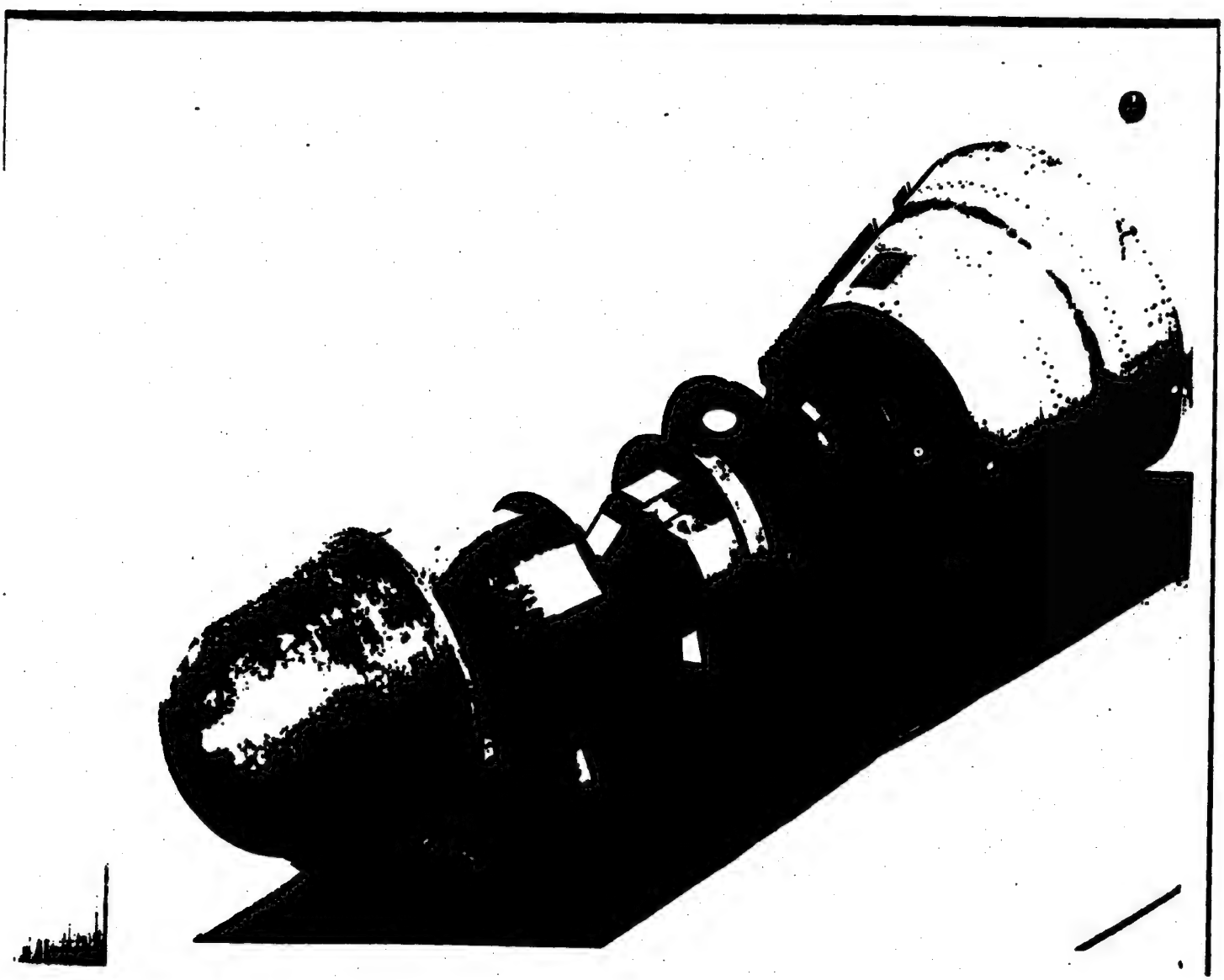

Test Run #2 - 10/4/62
0100 EST to 0750 EST
~ 260,000' Alt.
Plates
Thermocouples
Plates
Plates
Skin
Center Plate
Left Plate
Plates - Left
Plates - Center
Time of Day
TYPICAL THERMAL DATA

CRITICAL MAX & MIN DATA POINTS





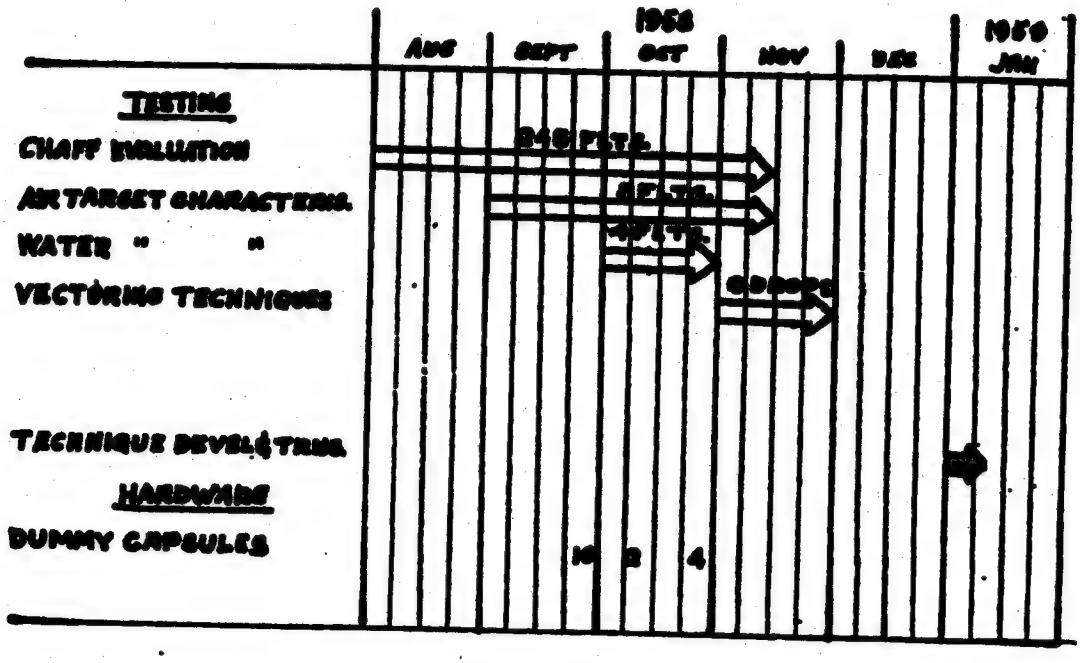




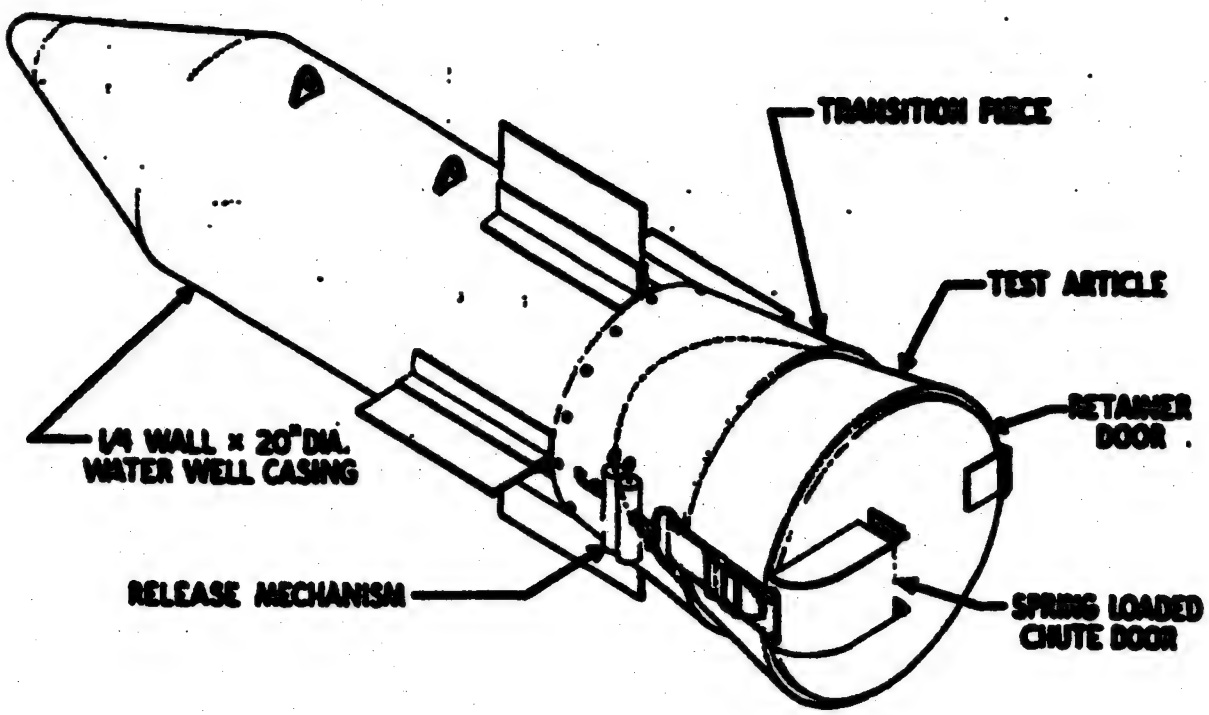
RECOVERY TESTING PROGRAM

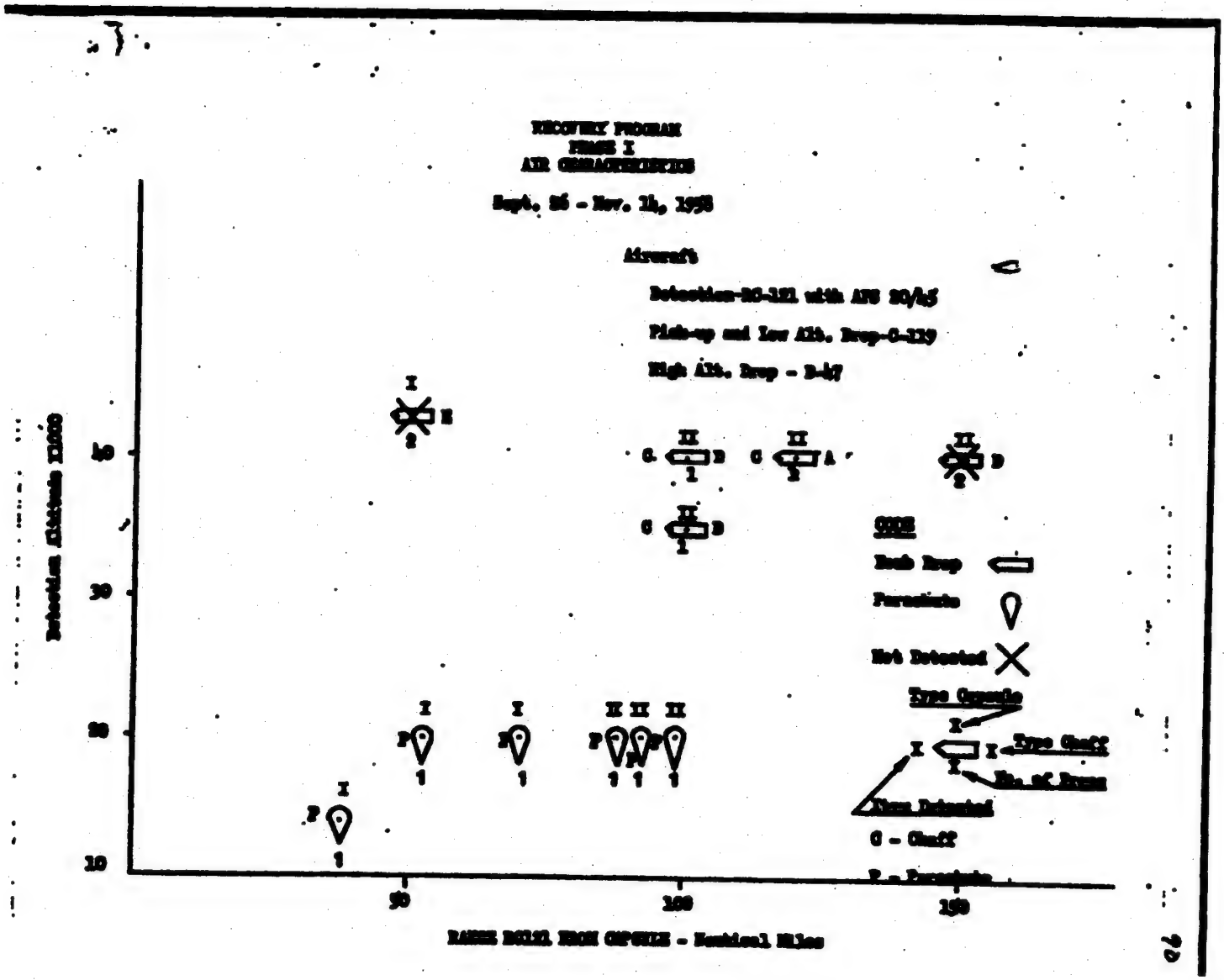
- CHAFF EVALUATION
- AIR TARGET CHARACTERISTICS
- WATER TARGET CHARACTERISTICS
- VECTORING TECHNIQUES & PICKUP
- OPERATIONAL VEHICLE AIR PICKUP
- OPERATIONAL VEHICLE WATER IMPACT
- OPERATIONAL REHEARSAL

RECOVERY TESTING & PROGRAM SUPPORT



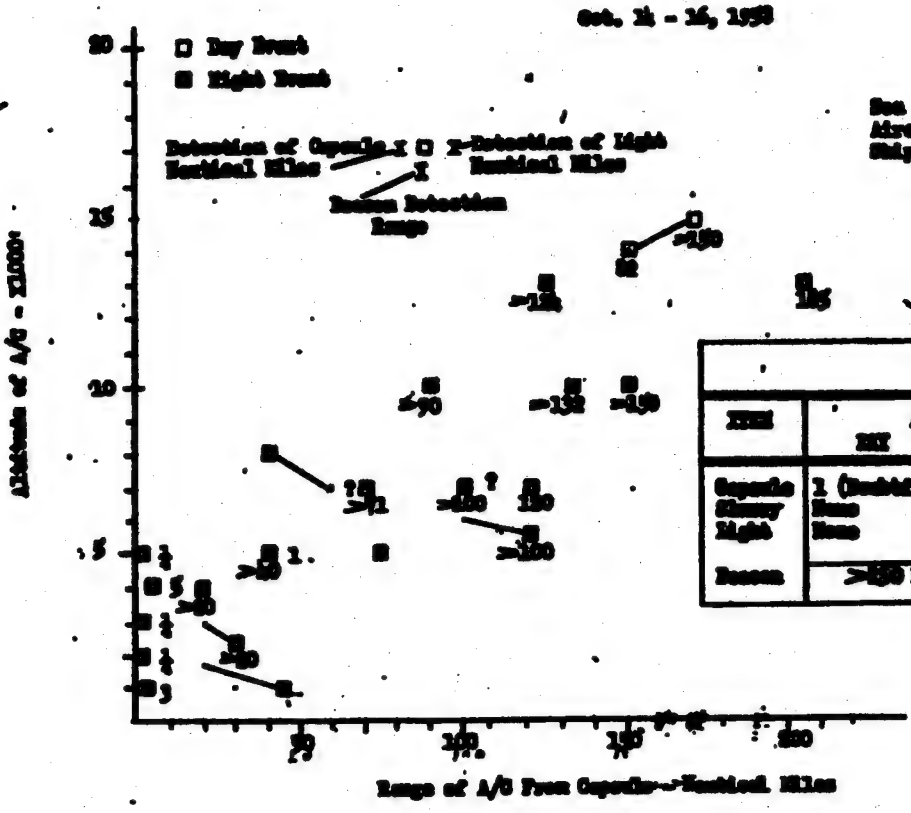
CAPSULE DROP BOMB




RECOVERY PROGRAM
PHASE I
AIR CHARACTERIZATION
Sept. 26 - Nov. 14, 1958
Aircraft
Detection-RC-121 with APS 20/45
Pick-up and Low Alt. Drop-C-119
High Alt. Drop - B-47
Detection Altitude X1000
Type Cloud
No. of Drops
Type Detected
C - Cloud
P - Parachute
Sub Drop
Parachute
Not Detected
RADIUS MILES FROM CENTER - Nautical Miles

RECOVERY PROGRAM
PHASE II
WATER TRIGGER CHARACTERISTICS
AERIAL AND SURFACE

Oct. 14 - 16, 1958

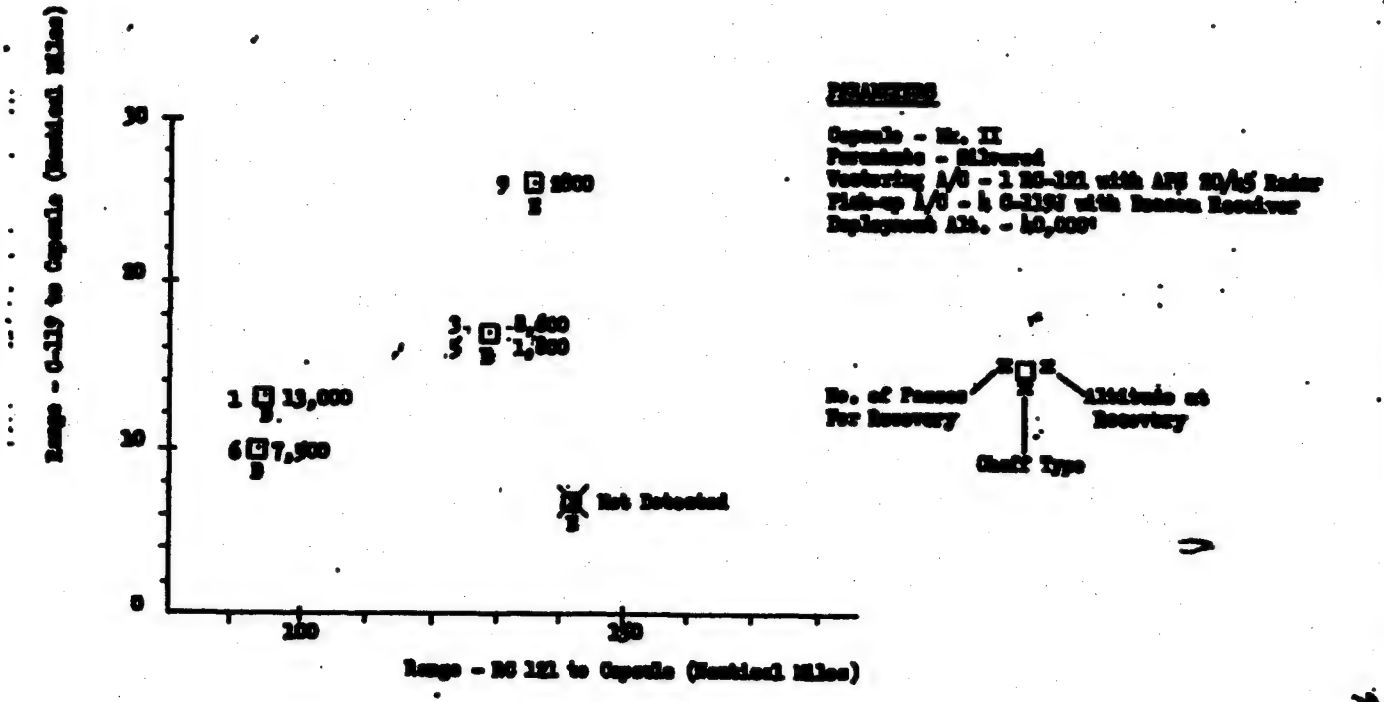


Sea State #4 (6' - 10' waves).
Aircraft - 2 - SH3D with HF.
Ship - SS Brinkley - Destroyer

TRIGGER				
TYPE	AERIAL		SURFACE	
	DAY	NIGHT	DAY	NIGHT
Capsule	1 (Doubtful)	-	24 Miles with	-
Sliney	None	-	<100 Yds.	-
Night	None	2-3 N. Miles (HF Aerial)	50 Yds.	2-3 N. Miles
Beacon	>100 N. Miles		50 N. Miles	

RECOVERY PROGRAM
PHASE III
VENTURING TECHNIQUES AND AIR PICK-UP

Nov. 24 - 26, 1958

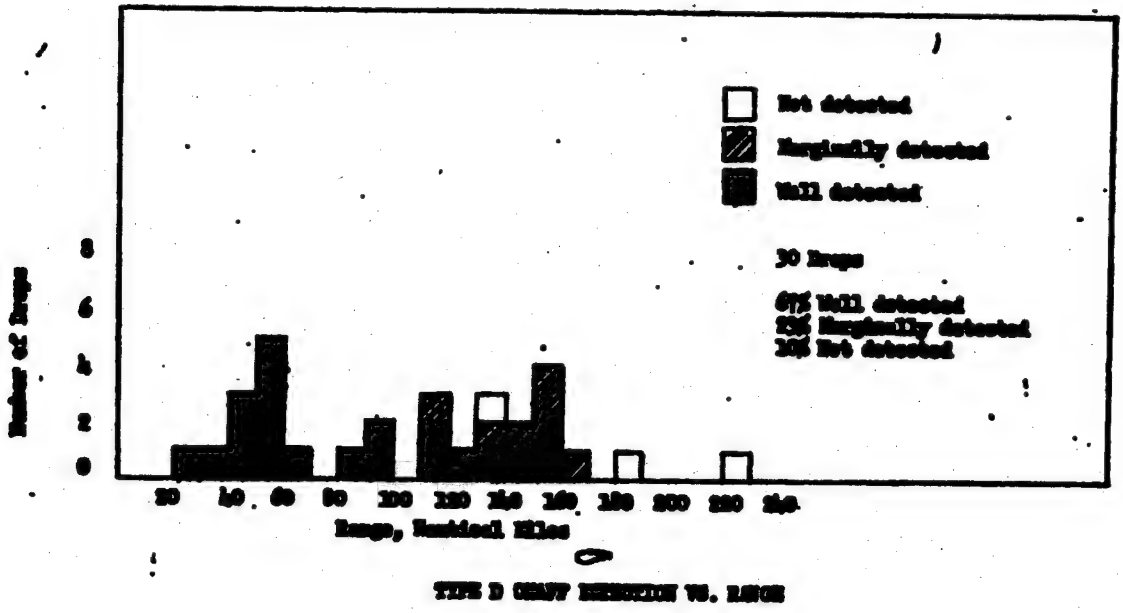


AERIAL RECOVERIES

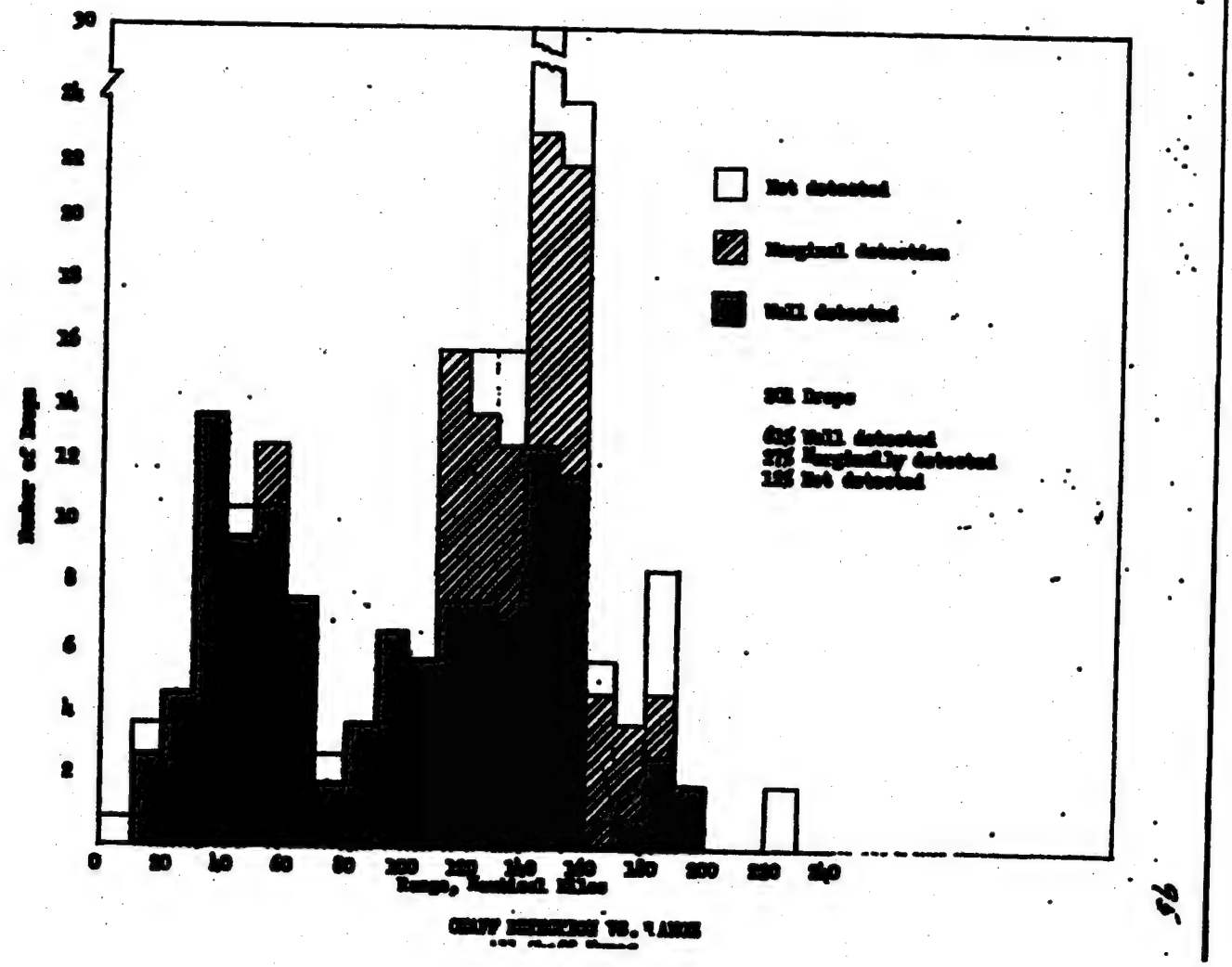
PARACHUTE	DROPS	CONTACTS	RECOVERIES	AVERAGE PASSES PER CONTACT
MK I				
Mod. 0	18	16	7(44%)	---
1	1	1	1(100%)	4.0
2	12	10	6(60%)	3.3
TOTAL	31	27	14(52%)	---
MK II				
Mod. 0	17	15	11(73%)	3.7
1	1	1	0(0%)	4.0
2	10	7	4(57%)	3.5
TOTAL	28	23	15(65%)	3.7
TRAINING				
14'	58	---	37	---
24'	81	---	52	---
TOTAL	139	---	89	---

NOTES:

1. Recovery percentages based on contacts, not drops.
2. Average passes per contact based on total passes, including those for chutes not contacted.
3. Mk. I and Mk. II drops include those made in load tests and in Phase II tests (over water) for which data are available.



TYPE D CHAFF REJECTION VS. RANGE


Number of Drops
Range, Nautical Miles
Not detected
Marginal detection
Well detected
Well detected
Marginally detected
Not detected

PARACHUTE SINK RATE

PARACHUTE MODEL	PARACHUTE WEIGHT [illegible]	FLAT DIA.	SINK RATE (FPS) AT 1000' ALT.	PARACHUTE STABILITY (PILOT REPORT)
MK I - 0	3.6	14.25	27.3	POOR
MK II - 0	7.5	20.0	25.2	POOR
MK I - 1	5.6	14.25	NO DATA	POOR
MK I - 1	8.9	20.0	NO DATA	POOR
MK I - 2	5.1	14.0	32.0	ACCEPTABLE
MK II - 2	9.3	20.0	30.0	ACCEPTABLE
MK I - 3	5.5	16.5	27.9, 26.1	ACCEPTABLE
MK II - 3	11.3	24.0	25.5, 26.0	ACCEPTABLE
MK II - 3A	11.3	24.0	28.9, 29.7	UNSATISFACTORY
MK II - 4	13.3	28.0	20.8, 20.5	GOOD

CONFIGURATION DEVELOPMENT

Mod. 1 - Parachutes

Same as Mod 0 except for reinforced lines and vented canopy. Improvement of stability was insignificant and rate of descent increased considerably.

Mod. 2 - Parachutes

Same reinforcements as Mod 1, vents deleted, and skirt extended to 15% in lieu of 10%. Stability was improved, but sink rate was increased.

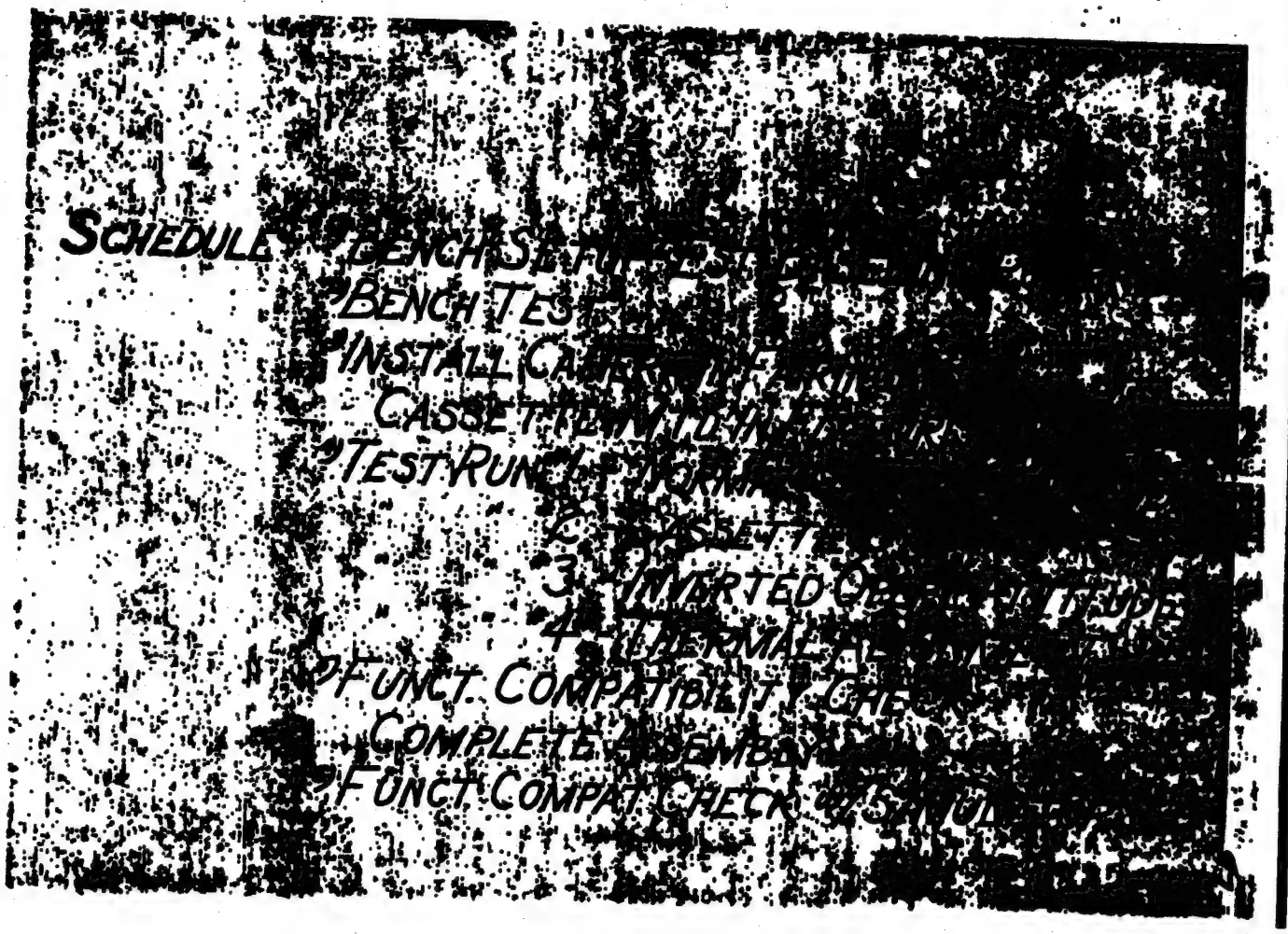
Mod. 3, 3A and 4 - Parachutes

Same reinforcements as Mod 1, no vents, and diameters increased. The stability of Mods. 3 and 4 was acceptable but Mod 3A was unsatisfactory.

ALIGNMENT - COMPATIBILITY

INTERFACE TESTS

FACILITY - ITEK WALTHAM PLANT - BOSTON
PERSONNEL - FAIRCHILD, ITEK, LOCKHEED, G.E.
DATE - JAN. 12-16, 1959
TEST SPECIMEN - CAMERA - ENGRG. MODEL
REENTRY CAPS. - PROD. UNIT NO. 101
NOSE CONE FAIRING - FLT. UNIT
SCOPE - 1) CHECK MTG. ALIGN. OF CAMERA IN FAIRING, UNDER OPERATIONAL TEMP. GRADIENTS OF SKIN.
2) CHECK COMPATIBILITY OF CAMERA, FAIRING & REENTRY CAPSULE.


SCHEDULE
BENCH
BENCH TES
INSTALL CA
CASSE
TEST RUN
2
3 - INVERTED
4 -
FUNCT. COMPATIBILIT
COMPLETE
FUNCT. COMPAT. CHECK

TEST #2

THERMAL GRADIENT

THERMOCOUPLE	BASE LINE	T_1 2 Hours	T_2 3 Hours	T_3 4 Hours	T_4 5 Hours	REMARKS
1 - 7	80°	186°	166°	235°	246°	TOP F&D ACCESS DOOR
2 - 8	81°	130°	121°	153°	155°	RGT. HORIZON "
3 - 9	82°	173°	161°	235°	249°	TOP-UNDER MTG. FINGERS
4 - 10	80°	104°	107°	122°	127°	LEFT HORIZON DOOR
5 - 11	80°	89°	95°	106°	110°	CAMERA MTG. PLATE
6 - 12	46°	39°	39°	39°	40°	CENTER BOTTOM
ARM CURRENT						
NOMINAL Vin	3.0 amps	3.5 amps	3.8 amps	3.6 amps	3.8 amps	
HIGH Vin	3.5 "	10.5 "	10.5 "	10.5 "	11.0 "	

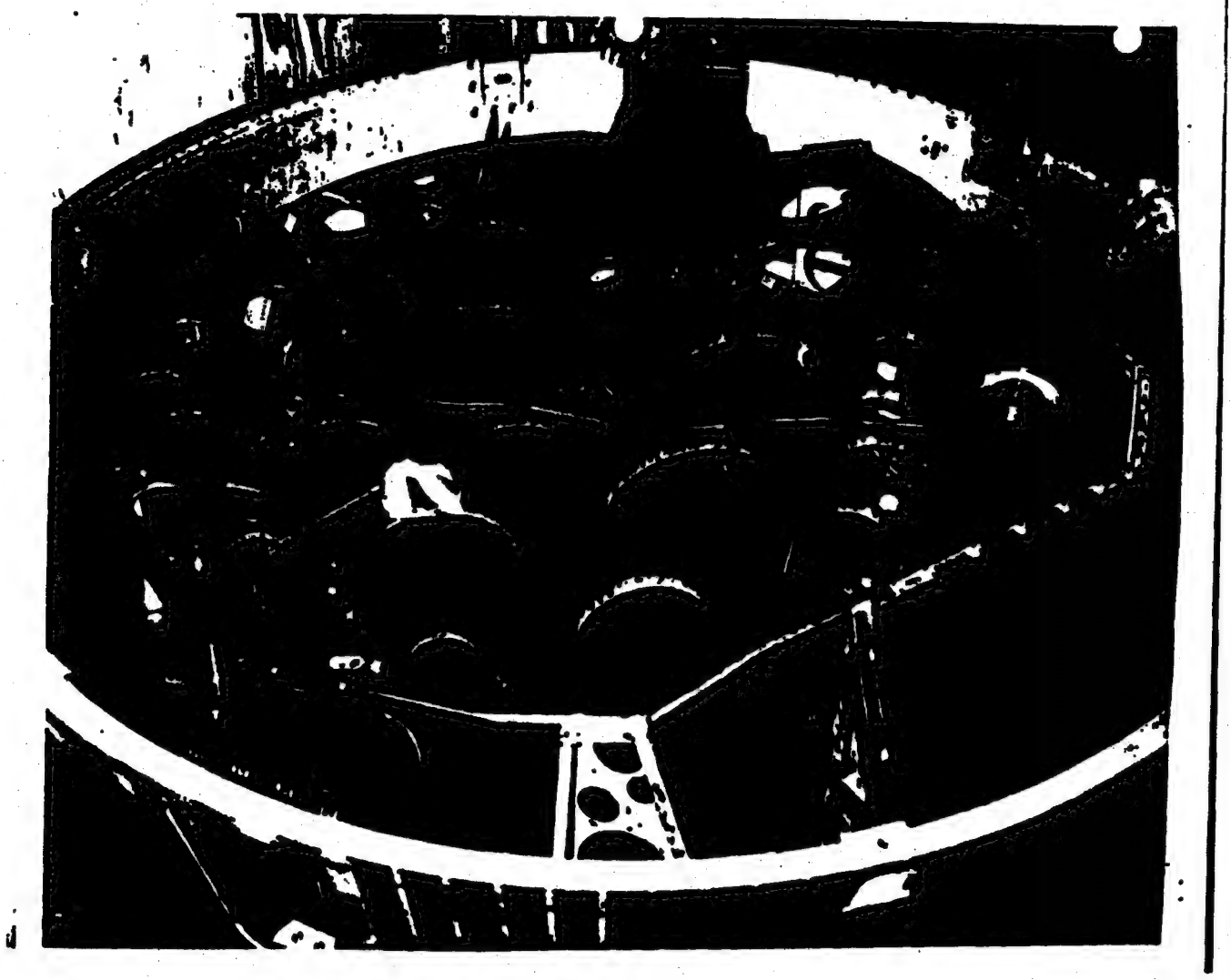
ALIGNMENT TEST-RECONNAISSANCE SYSTEM

	ARMATURE CURRENT-BENCH TEST		ARMATURE CURRENT-CAMERA MTD. IN FAIRING						ARMATURE CURRENT-COMPLETE ASSEMBLY			
			MERCURY DRIVEN, LENS UP				NORMAL, LENS UP		FIRST RUN		SECOND RUN	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
X-COM. POS. 1	1.8	6.5	2.5	7.8	2.8	8.5	3.0	9.6	2.7	9.0	2.5	9.0
2	2.1	7.2	2.7	8.2	3.0	9.0	3.0	10.2	2.8	9.5	2.7	9.5
3	2.3	7.4	2.7	8.8	3.0	9.0	3.0	10.5	2.8	10.0	2.7	9.5
4	2.3	7.6	2.7	8.8	3.0	9.0	3.0	10.5	2.8	10.0	2.5	9.5
5	2.3	7.6	2.7	9.0	3.0	9.5	3.0	10.5	2.8	10.0	2.8	9.5
NOMINAL 6	2.3	7.8	2.8	9.1	3.0	9.5	3.0	10.5	2.8	10.0	2.8	9.7
7	2.3	7.8	2.9	9.2	3.0	9.5	3.0	10.5	2.8	10.0	2.8	9.8
8	2.3	7.8	2.9	9.4	3.0	9.5	3.0	10.5	2.8	10.0	2.7	10.0
9	2.4	8.2	3.0	9.5	3.0	10.0	3.0	10.5	2.9	10.5	2.8	10.0
10	2.4	8.6	3.0	9.8	3.0	10.3	3.0	10.5	FILM BROKE		2.9	10.5
11	2.4	8.8	3.0	9.8	3.0	10.3	3.0	10.5			3.0	10.5

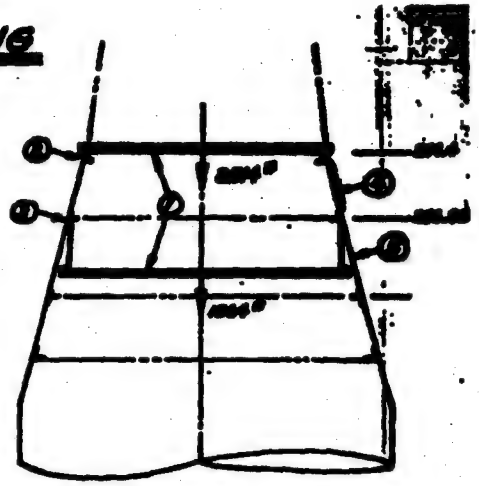
NOTE: FILM HANDLING MECHANISM SUPPLY SPOOL DRAG INCREASED.

DURATION 15 MIN. TOTAL

NOTE: AFTER EACH SCAN SEQUENCE THROUGH 11 POSITIONS, CAMERA WAS RUN FOR 15 MIN. AT NOMINAL SPEED



ALIGNMENT TEST - FAIRING



COND I: LIMIT LOAD, PEAK TEMP (SKIN) @ ⑤

COND II: AFTER TEST, NO LOAD, ROOM TEMP

TEST DESCRIPTION:

A A PRODUCTION FAIRING WAS INSTRUMENTED AND SUBJECTED TO SIMULATED EXIT HEATING AND LOADING CONDITIONS

B 28 DEFLECTIONS AND 18 TEMPS. WERE RECORDED DURING HEAT & LOAD CYCLE

C UNIT WAS ALLOWED TO COOL TO ROOM TEMP AND ALIGNMENT OF PLATES ① WAS CHECKED MECHANICALLY

DEFLECTION MEASUREMENTS - MAX.

COND I

- ① RELATIVE IN PLANE TRANSLATION OF PLATES
  X-X AXIS .004" (1 PT)
  Y-Y AXIS .005" (1 PT)
  OUT OF PARALLEL MEASUREMENT OF PLATES
  X-X AXIS .005" @ 25.5"
- ② AVERAGE DIA. CHANGE OF RING (SKIN STA 4)
  X-X AXIS .092" INCREASE
  Y-Y AXIS .184" INCREASE
- ③ AVERAGE DIA. CHANGE OF RING (SKIN STA 96)
  X-X AXIS .220" INCREASE
  Y-Y AXIS .284" INCREASE
- ④ AVG. LOCAL SKIN DEFLECTION .104"
- ⑤ " " " " .125"

COND II

- ① ALIGNMENT OF PLATES
  IN PLANE TRANSLATION 0.00"
  AXIAL SEPERATION 0.080"
  OUT OF PARALLEL 0.007" @ 25.5"

CONCLUSION

EXIT HEATING AND AXIAL LOADING WILL NOT CAUSE MIS-ALIGNMENT SUFFICIENT TO IMPAIR OPERATION OF OMEGA & CABLE

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Operations

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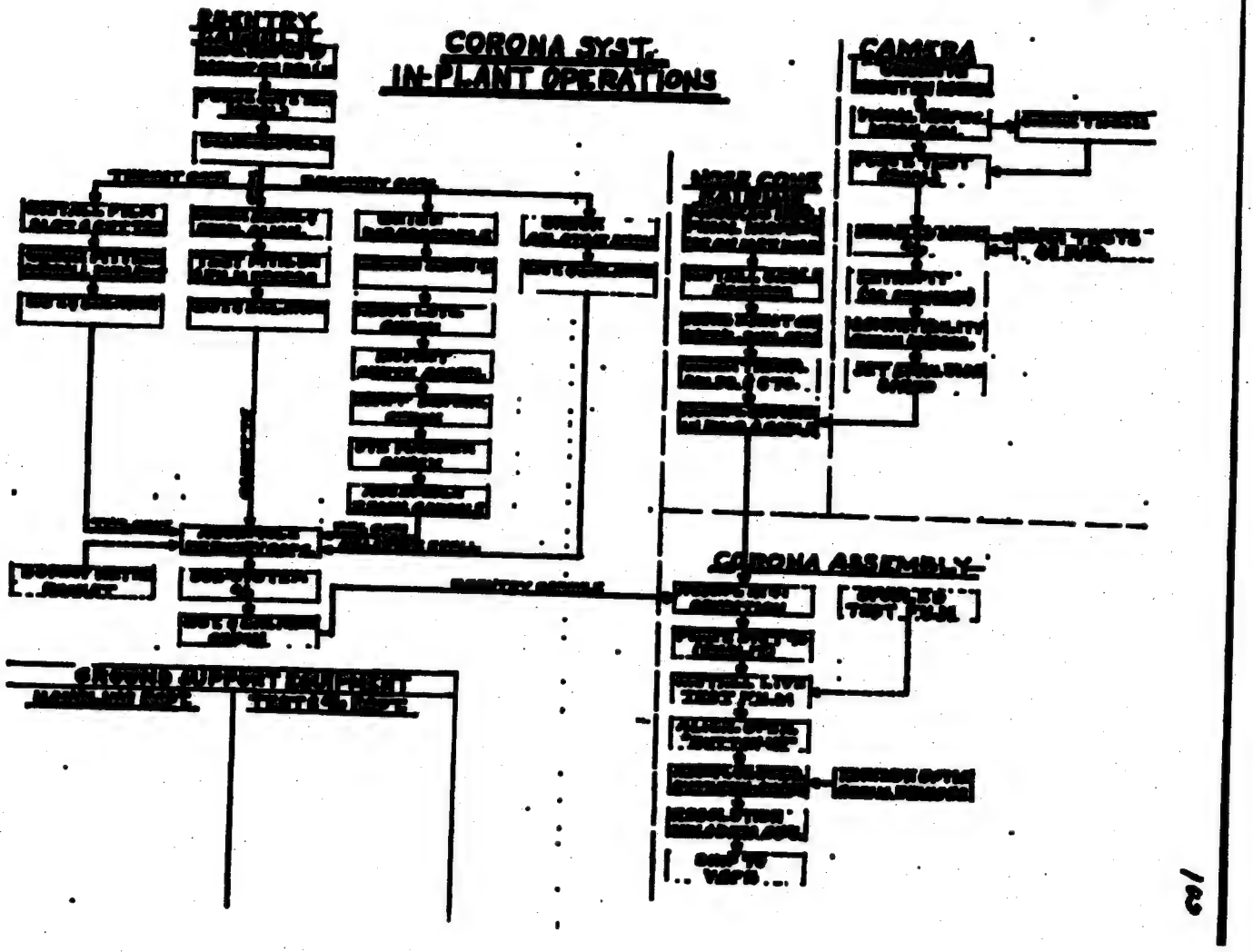
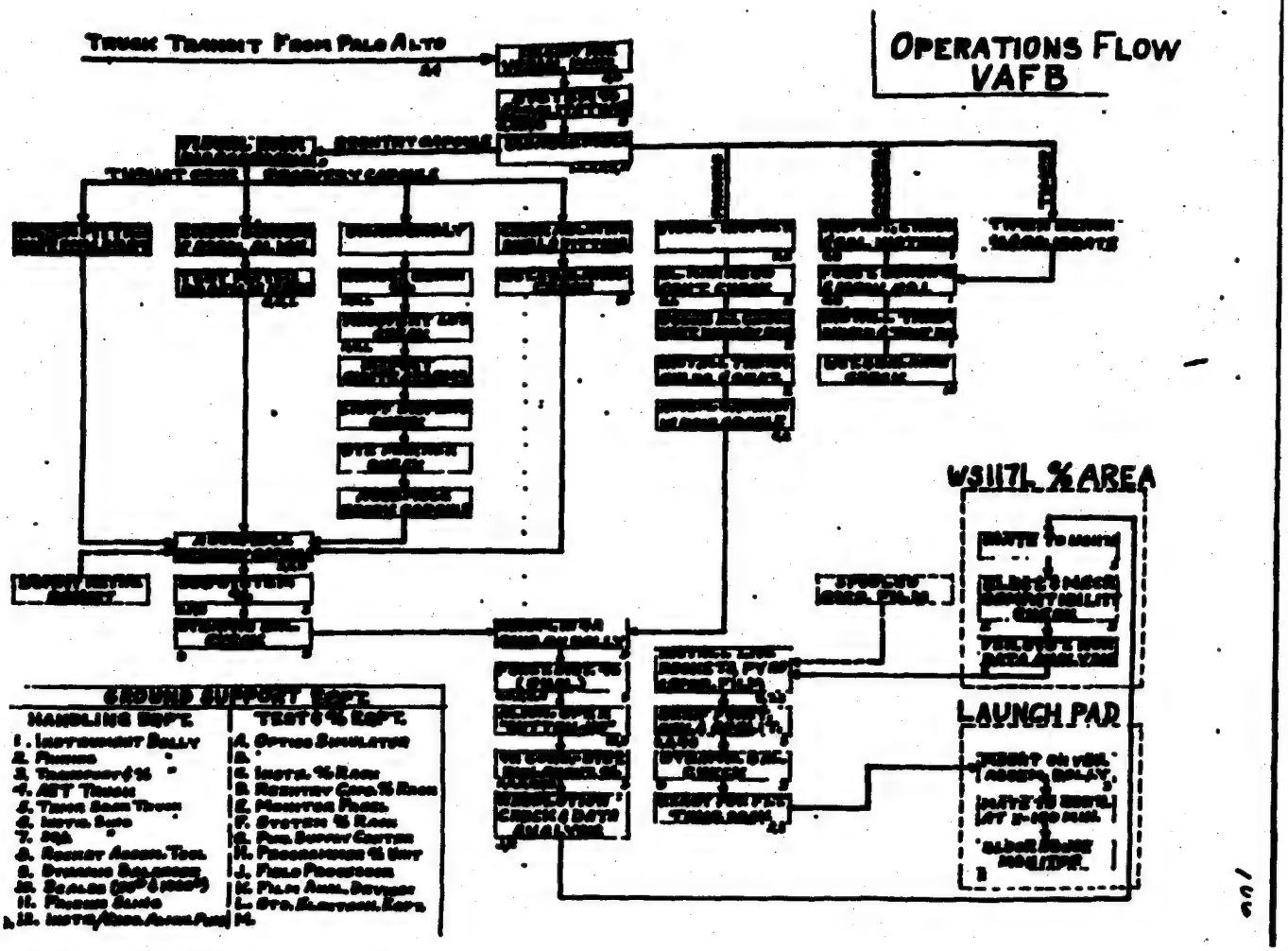
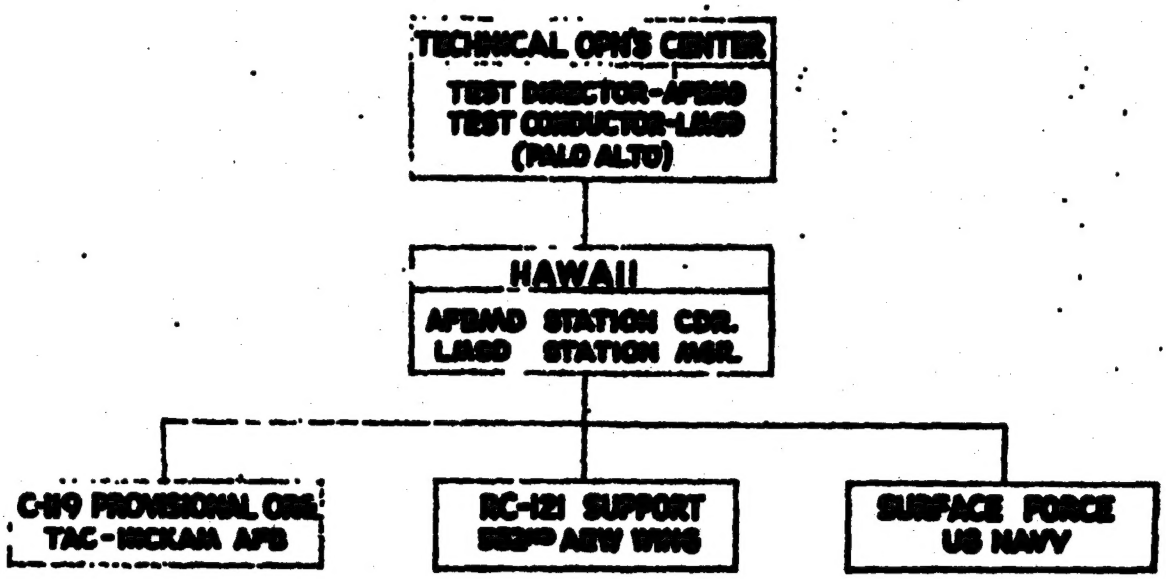

CORONA SYST
IN-PLANT OPERATIONS
CAMERA
CORONA ASSEMBLY
GROUND SUPPORT EQUIPMENT


TRUCK TRANSIT FROM PALO ALTO
OPERATIONS FLOW
VAFB
WSIIITL % AREA
LAUNCH PAD
GROUND SUPPORT EQPT.
HANDLING EQPT.
TEST & SUP. EQPT.

WS117L RECOVERY SYSTEM CONTROL

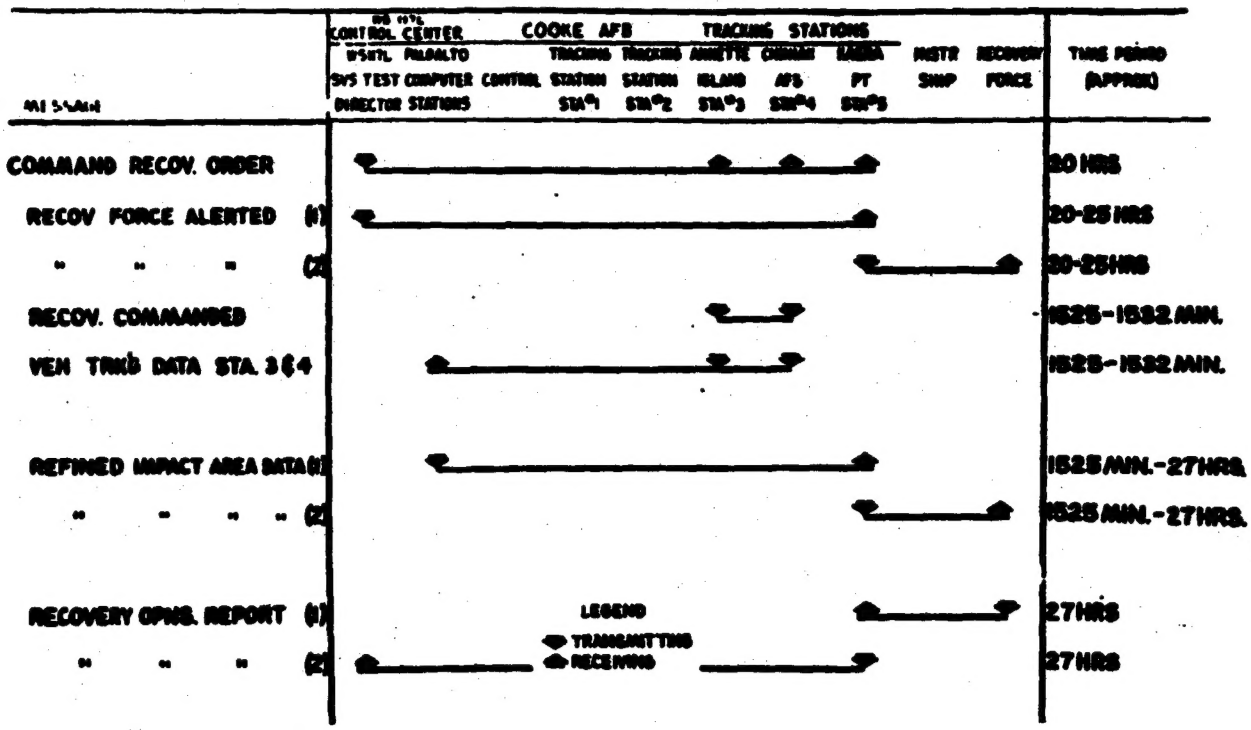
PROGRAM IIA



WSTI7L RECOVERY COMMAND & DATA MESSAGE FLOW

SECRET

PROGRAM IIA



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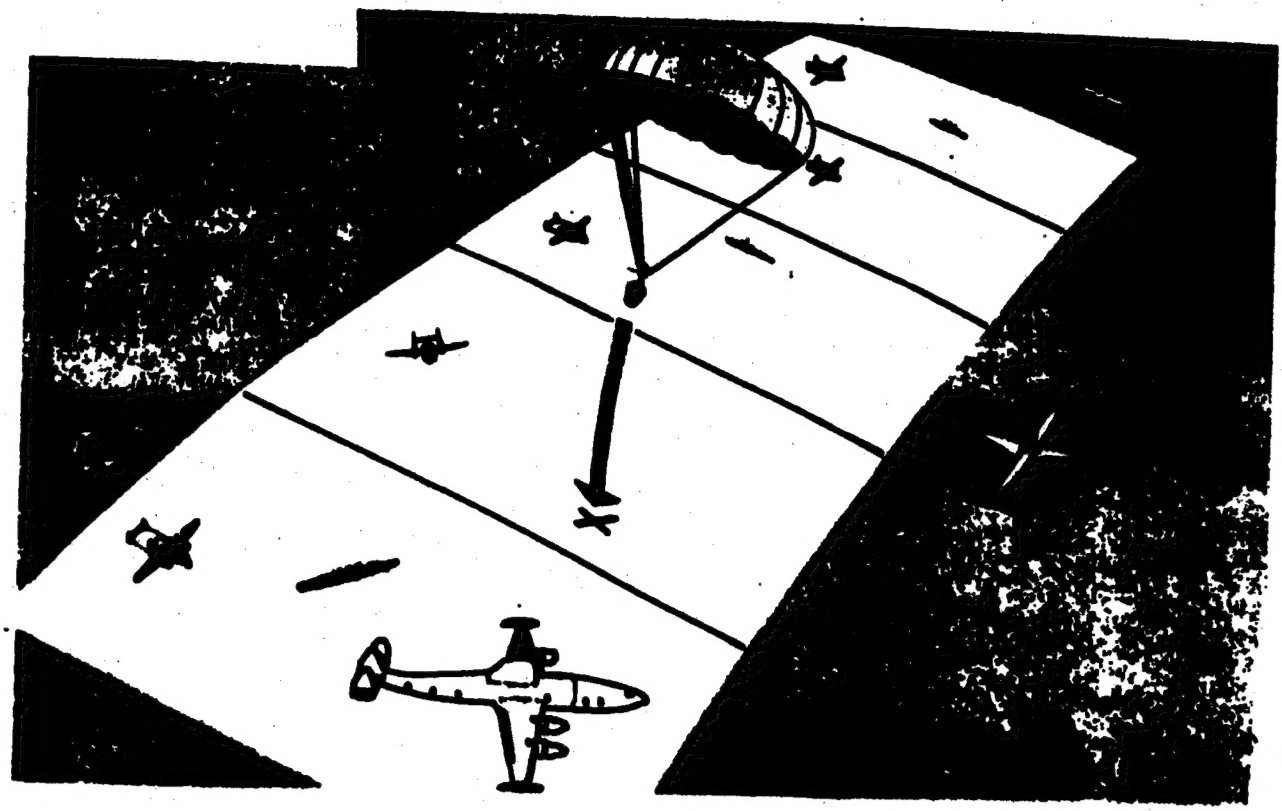
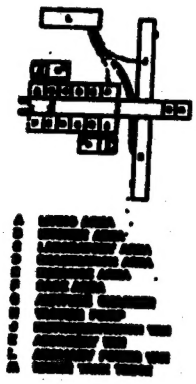
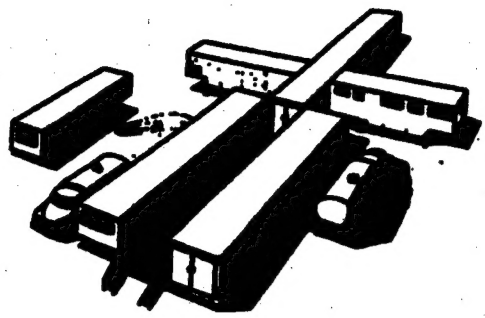
RECOVERY OPERATIONS



~~SECRET~~

AERO MEDICAL VAN COMPLEX





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